

# **Asset-based Mapping Approaches to a Framework of Poverty Monitoring System**

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**Key words:** Asset management, Asset mapping, Poverty information, Hexad asset model.

## **SUMMARY**

Accesses to the basic rights of education, food, clothes, proper health care, clean water, land and housing are primary human needs and strong solutions for asset poverty with which marginalized people are faced. Although many different analyses and models have put an emphasis on the relationship between asset and the poor, there might be problematic obstacles to indicate a tangible framework as to how asset impact on multidimensionality of poor variances. Meanwhile, assets are often defined as right and claims to property, possessions, means, and knowledges that embrace tangible or intangible substances. Assets can play a major role in economic powers and commercial bargains that not only provide more opportunities for capital dominances, but also protect future risks and vulnerabilities, and escape poverty alleviations and destitutions. The Hexad assets are used to expound causes and results of asset divide and provide feasible solution for poverty monitoring system

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## **1. INTRODUCTION**

Diverse applications and usages of asset mapping and management lead to different profiles and definitions of assets ranging from engineering, finances, industry to socio-economics. An asset management has often focused on countable or measurable characteristics of assets or capitals such as physical, financial and digital objects. This management is also considered to be an information-based form that offers accurate records of individual/households, community and local assets circumstances. Meanwhile, assets are often defined as right and claims to property, possessions, means, and knowledges that embrace tangible or intangible substances. Measuring diversities of six assets with regard to ownership and access in individuals and households are problematic questions because the mechanisms of assets inter-linkages are so complicate and volatile that existing concept of asset management might not be unable to assess status quo of poor households.

The asset poverty is also regarded as disparities of access to and use of information and communication asset between countries and groups or individuals within a certain organization. The disparities of digital asset are closely related with conventional notions of intellectual gap that electronic or electrical uses and technical knowledge could be a part of landmarks of information society. There still exists socio-economic inequality and technical exclusion between the asset haves and the asset have-nots. To scrutinize the reasons of the asset divide in this research, causal mechanisms between the divides and asset poverty are illustrated around a central role of asset management and are focused on the asset poor and marginalized groups who experiences economic poverty, social exclusion and digital divide through interpreting the Hexad model.

Mostly lands and housings are regarded as productive assets or even valuable future stocks. Lands and housings generally make real income when space is rented or provides a site for household productions and small boutiques. These assets are directly or indirectly connected with a part of financial assets, but are used to physically measure human quality of lives, and land and environmental degradations (Ballayan, 2001; Narian, 2001). Measuring and building asset informations are concerned with creation of an asset map at the individuals/households level when local or commune authorities help poor households define their capacities and determine what assets are available to escape poor circumstances and improve their socio-economic abilities for basic human needs and desires.

A principal idea of LIS-based asset mapping or asset management is to assist in households and communities to estimate their assets as to how they can maximize the strengths of their capacities and minimize risk and vulnerability of poor environments. In this study, to expound the relationships between asset and people's livelihoods, the Hexad asset model is proposed to suggest a conceptual framework of asset

management linking to land (or geographic) information systems. Detecting movable assets and collecting asset informations might be required for detailed descriptions of surveying and mapping with time that pertains to real investigations of snapshots or visualizations (Akinyemi, 2001) for the real world, particularly descriptions of poor communities and households.

## **2. AN ANALYTICAL FRAMEWORK FOR ASSET POVERTY**

Many theories and models have long discussed the real truth of socio-economical and cultural problems of poverty. This paper, however, does not deal with conventional approaches to multi-dimensionality of poverty, but concentrates on causal mechanisms between asset divide and poverty (UNDP, 2001; World Bank, 2001). around a central pivot of land information because accesses to lands and houses are regarded as very fundamental human needs to escape asset poverty. Fig. 1 offers some ideas of a conceptual framework of asset poverty ranging from economic dimension to digital dimension that a dominant poverty indicator or several factors of poor conditions bring about economic poverty, social exclusion, and technical gulf that reiterates vicious cycles of the asset divide. Economic poverty begins with understandings of asset-based or income-based measure of poverty considering income's affordability for production and consumption as a basic needs indicator in spatial dimensions of poverty (Hentschel et al., 1998).

It often causes the economic divide or income divide. This economic poverty seriously impacts on individual education, food insecurity (Swaminathan, 2000), skill and knowledge as one of asset poverties. Those who appear to be social exclusion or isolation in digital society could rarely enjoy economic gains and socio-cultural benefits. Social exclusion prevents disadvantaged groups from contributing to or benefiting from the economy and society. These two negative influences could give rise to technical gap or the digital divide with regard to lacks of access to computers, Internet and other electronic utilities and shelters as evident differences based on race, gender, demography and geography, economic status, and physical ability. Digital exclusion of marginalized people is a principal factor to give rise to serious polarization of information society and lead to lacks of ICT access, usage and application.

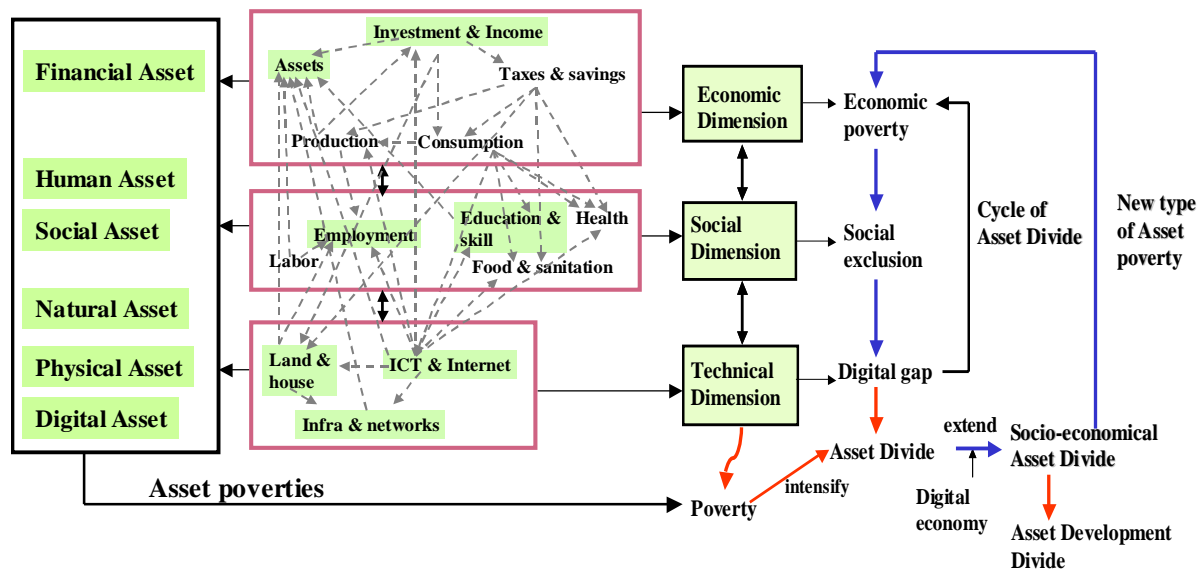


Fig.1. Causal mechanisms between the asset divide and poverty

The asset divide not only derives from technology-oriented paucities, but also result from causal outcomes of socio-economic and technical burdens such as low-income, unemployment, food insecurity, disability, and low education & skills, and others (De Janvry and Sadoulet, 1996). Considering widespread of e-commerce and Internet banking, astonishing advance of e-economy could cause another shadow of socio-economic asset divide and asset development divide. Although there are several approaches to interpretation of asset's role for poverty eradication, few works and studies might have been done with regard to causal relationships and consequent results between the asset divide and poverty based on the concept of parcel-based land information focusing on six parameters of a poverty profile.

### 3. ASSET-BASED APPROACH TO ASSET POVERTY'S INTERPRETATION

Deiningner and Squire (1996) mention that possession of land can be a major determinant of an individual's productive capacity and their ability to invest in agrarian societies and highly dense population areas where land is a major asset (Drimie, and Mbaya, 2001). Given the fact that the degree of inequality for land redistribution leads to wealth gaps in some African societies (Sibanda, 2001; Selebalo, 2001), we may reconsider traditional aspects of land conflicts and dilemma how land information correlated with the improvement of sustainable asset for the poor (Markandya, 2001).

Six parameters of poverty profile are used to assist the framework for information system architecture (Sowa and Zachman, 1992) and are shed on the light at the domain of spatio-temporal data modeling (Liou, 1999, 2001). Six assets linking to a poverty profile, called Hexad asset model is used to depict the asset poor and to trace asset flows, but is limited to describe poor circumstances and conditions without interviews and field surveys. This model should be linked to more details of

household surveys and data collection methods such as the LSMS (Grosh and Munoz, 1996) and DHS (Westoff, 2000), and others if there are demands for full descriptions of status quo of poverty and practical ways of escape.

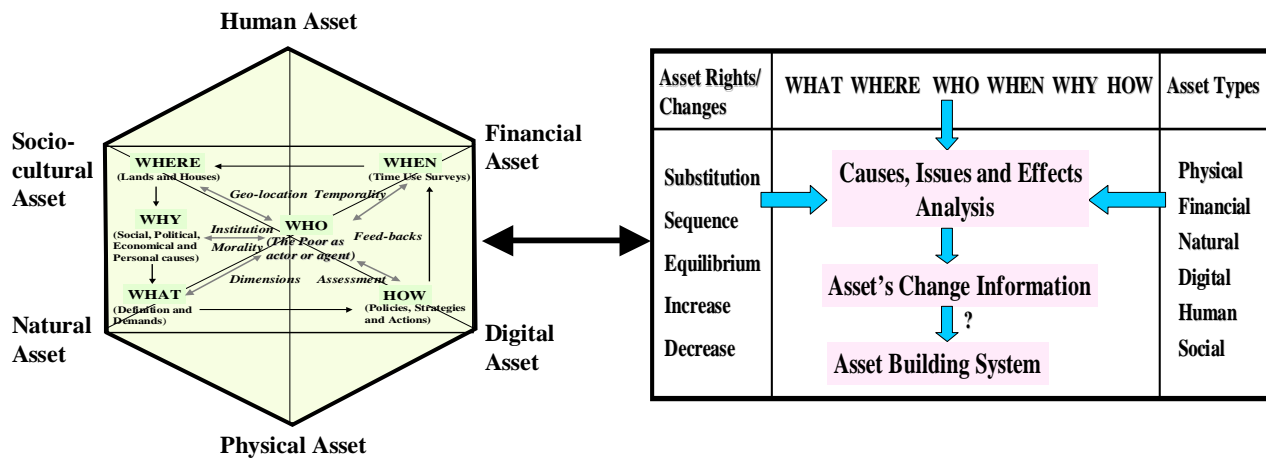


Fig. 2. Hexad asset model for poverty interpretation

Surveying and asset mapping (Sehlin and Bodin, 1996; Henninger, 1998) of for spatial conditions of asset poverty starts to address the geo-locations of asset poor (Fig. 2) as to where the asset poor live, why and when they move in poor situations and what kinds of asset poverty they are faced with and how local and national authority can establish asset building programs and community capacity projects. A similar idea of this concept is recently focused on the PASIR (Duraiappah et al., 2000) framework pertaining to poverty-environmental degradation in relation to spatial and temporal dynamics of the changes.

#### 4. DESIGNING AND IMPLEMENTING ASSET-BASED LAND INFORMATION

The internet-based land information as valuable digital asset (Moody and Walsh, 1999), we may need to consider the use patterns and impacts of the land information, such as question about: Who are the major users ?, What do they use the land information ?, How can land information practices be measured and monitored over time ?, Why do they (individual/institution) get interested in the asset-based land information ? and Where are serious areas of the asset divide in our region ? These six factors give us a basic interpretation of the asset poor and enable to conjecture possible model in association with relationship between the asset divide and poverty. The Internet-based land information has more technical characteristics of communication, computing and conversation than commercial and social functions. Here, we may need to illustrate holistic approach to the asset-based land information model (Fig. 3).

Although there are also efforts for explanation of the Internet's effects on possible eradication of poverty in developing countries, there might be few works for causal mechanisms between digital asset and asset poverty as to how information and

communication technology (e.g. Internet) becomes a major engine of economic poverty or social inequality. This is a real problem mark to further investigate dark islands of cyberspace. Perhaps, these six parameters of a poverty profile and asset might be useful to interpret information asset poverty.

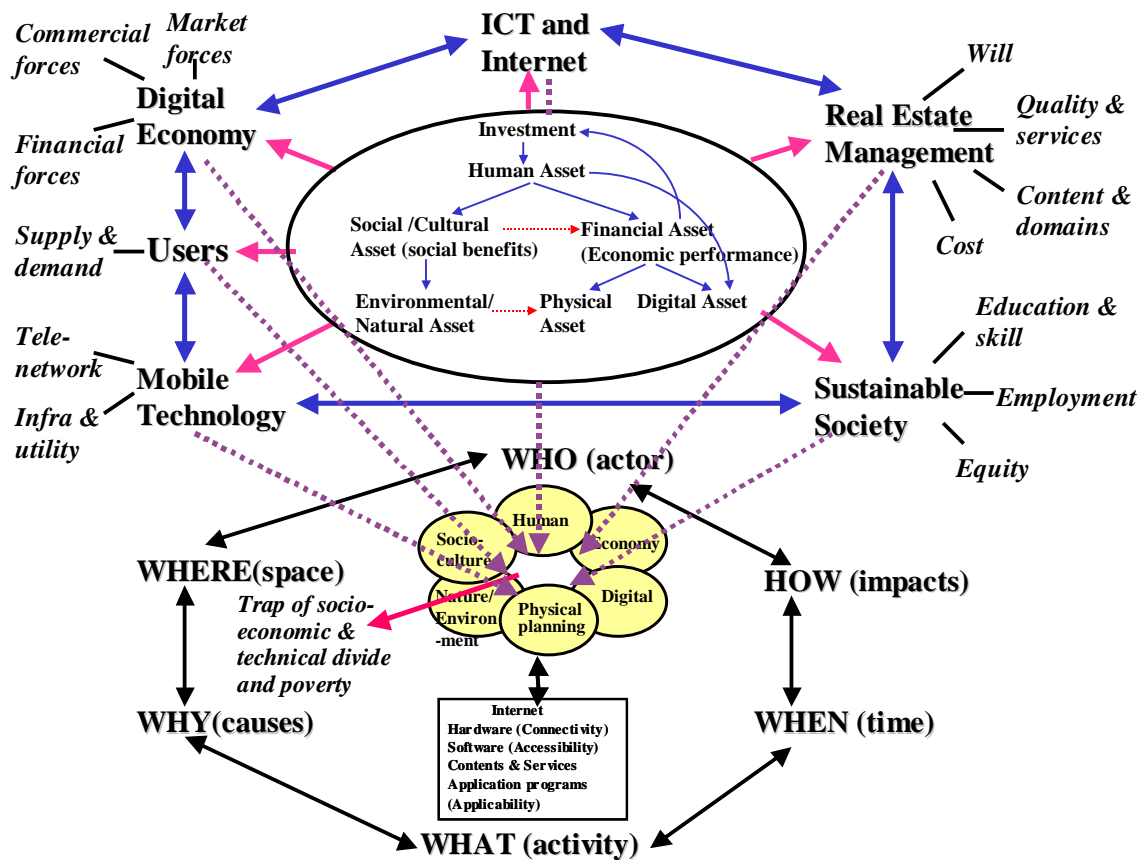


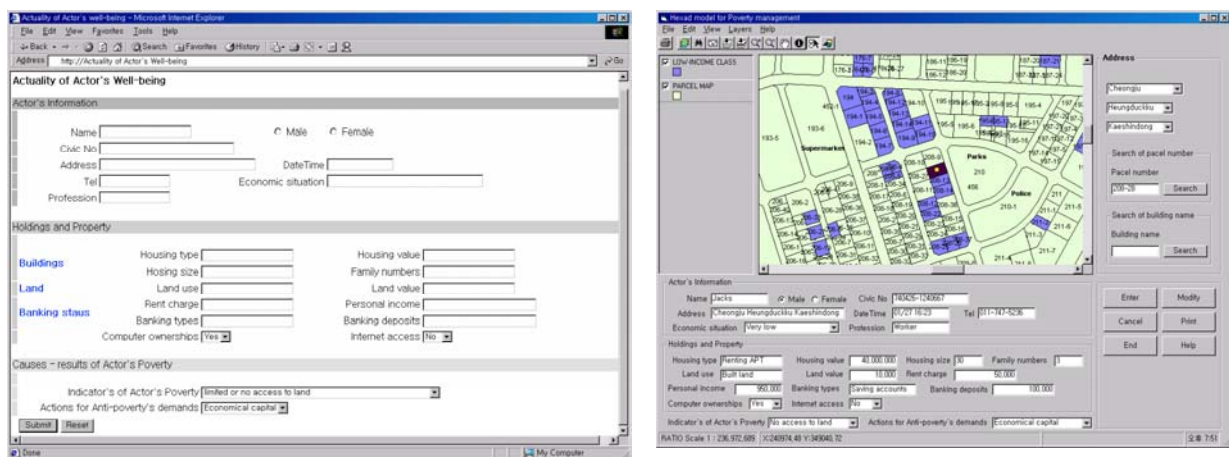
Fig.3. Multidimensional dimension of asset divide

The impacts of access and use of land information depend on different public and private consumer service sectors that continuously search for maximizing economic gains and information's benefits (Spink and Cole, 2001). It could lead to socio-economic inclusion and exclusion, or technical divide in the course of participation and aspiration of the Internet developments. On the contrary, expansions of the Internet contents of land information might be parallel to socio-cultural, political, industrial, technological growth at the regional level, and commercial and real estate transactions at the community or household level.

We illustrate a conceptual idea of Hexad asset model. Principally, it is discussed as confirmation of the feasibility of six parameter's application in parcel-level LIS environment. A full-scale expansion of six parameters to an integrated asset information system could be a large-scale project if it could include the great deal of welfare's services and the ranges of different software environment between land information and asset information system. Here, we describe geo-locations of asset poor circumstances to assist partly asset poverty monitoring and control through the conceptual model of Hexad.

Considering traditional census and household survey, and interviews with asset poor status quo, it is still required for huge expenses and time-consuming tasks to continuously maintain their individual information and data of asset. To prove effectiveness and efficiency of conceptual model of Hexad in asset management, the Internet-based menu system (Fig. 4A) is proposed to support asset poor who often need to secretly express their living conditions and qualities no matter where they are. One of clear things is that asset poor are unwilling to confess their current difficulties and scarcities due to the matters of socio-economical paucities of dignities. Basic ways for eradication of asset poverty may depend on characteristics of the individual, the household, the community, and the consumption as well as affordability for payment of their lands and housing rents. These are not only associated with definition of human well-being, guideline of poverty indicators, economic recognition of the poor, and financial performance of government budget, but also surveying techniques and the data collection methods. This is why our menu system is made for client-oriented forms that enables asset poor to submit their opinions through the Internet, and then this information is only controlled by a local and commune administrator.

On the basis of narrow targeting at the individual or household level, data collection is very information-intensive, and the necessary information is costly compared with other geographical survey techniques. Thus, our Hexad model might be considered to be a feasible idea to reduce costs and times when this Web-based input system is further developed towards an integrated asset information system.



A) User interface of Hexad Model      B) Parcel-based mapping for poverty management

**Fig. 4.** User interface and parcel-based mapping for asset management

Based on conceptual idea of Hexad asset model, an appropriate way for asset poverty's identification through parcel-based LIS methodology is explored (Fig. 4B) which enables local or commune administrators to inspect complicated information on spatial distribution of asset poverty and certain circumstances of asset poor. Parcel-level inventory and asset-mapping (or property-mapping) in LIS environment allows

the collection and representation of social and economic data at the finest possible level of local and household or individual resolution that can assist in low-level census geography and digital landscape for nature of quality of life. The Internet can connect low-income class to asset information on loans or poverty alleviation schemes. In terms of benefits between land information and the Internet, where agricultural or urban lands are the main resources of their communities, information and knowledge about legal ownership of land, commercial values of land use, and urban land development plan through the Internet are principal resources enabling local or commune organizations to assist in individual asset poverty alleviations. In response to the asset divide and concerned poverties, asset-based mappings or community asset mappings approach to community development might be a crucial pathway to maximize their strengths and capacities of the individuals and neighborhoods.

These mappings provide some judgments as to what kinds of assets are available to help improve not only individual quality of life, and local employments and educations, but also collaborative networks of land and housing supply through the Internet. However, they require enormous developments of survey instruments and methods for collecting and gathering asset's information. This parcel-based map information can benefit further understandings of more accurate examination on asset poor in connection with their holdings and properties. Naturally, it depends upon the poor description whether they are asset poor or not. This is why their holdings and property are essential for indirectly measuring poor circumstances. Dark color of households shows low-income classes in a cadastral map. Administrators should input asset information through map's window when asset poor submit their poor conditions. Through the strengths of parcel-based mapping, administrators can visualize poor household's location and can approximately measure their living qualities. Although this visualization is surely not enough to determine asset poverty's seriousness, it provides easy ways and freedoms for geographical targeting of asset building programs and actions at the individual and household level.

## 5. CONCLUSIONS

This study examines causal mechanisms between the asset divide and poverty based on application of parcel-based LIS environment, proposing the Hexad model and a prototype of solution model for the asset divide and asset management. Since there are ongoing efforts for closing the asset divide analyzing and interpreting socio-economic, environmental, financial, and technological divides within umbrella of asset management, our conceptual model might have drawbacks to cope with multifold symptoms of the asset divide. As a clear evidence of economic divide, the economical gains would lead to serious land ownerships by elites and greater impoverishment when land administration and registration system could not guarantee economic problem of the poor, women, and other marginalized groups who are inaccessible to land and high burdens of urban utilities.

There might be lacks of serious attention to the causes of asset poverty, and analysis of structural factors such as differential access to the means of production and to political influence. Many researches have focused on the question of access to land



and consider land access as a major welfare role of the poverty reduction. However, they rarely discuss the risks of socio-technical exclusion presented by a lack of ICT and the Internet enabling the asset poor to look after better place of shelter and good information on job opportunity. Surely, there are additional requirements in dealing with 6 perspectives of asset without different environments of asset poor who continuously move here to there so as to find appropriate their living quality and escape asset poverty. Asset management is more larger than land information management when considering not only living standard survey for asset poverty in developing countries, but also growing issues of the asset divide and economical potentials of digital economy in advanced nations. Relative asset poverty is, today, negative signs of social polarization and intimidating the birth of digital economy stemming from labor market imbalance. The analysis of the Internet usage and impacts on the poor and the rich resulting in serious relative poverty gap in space over time should be further reconsidered within the framework of asset buildings for an integrated asset information system.

## REFERENCES

- Akinyemi, O. 2001, A GIS database design for urban poverty management. Proceedings of International Conference on Spatial Information for Sustainable Development, Nairobi, Kenya.
- Ballayan, D. 2001, Module 3: Agri-environmental statistics, Soil degradation, Fourth Sub-regional Training Workshop on Environment Statistics, Bangkok, <<http://www.unescap.org/stat/envstat/envstatws.htm>>.
- Deininger, K., and Squire, L. 1996, New ways of looking at old issues: Inequality and growth, mimeo.
- De Janvry, A., and Sadoulet, E. 1996, Growth, inequality, and poverty in Latin America. Working Paper No-784, University of California at Berkeley.
- Drimie, S., and Mbaya, S. 2001, Land reform and poverty alleviation in Southern Africa: Towards greater impact. Proceedings of SARPAN Conference on Land Reform and Poverty Alleviation, Pretoria, South Africa.
- Duraiappah, A.K., Ikiara, K., Manundu, M., Nyangena, W., and Sinange, R. 2000, Land tenure, land use, environmental degradation and conflict resolution: A PASIR Analysis for the Narok District, Kenya, CREED working paper No 33, IIED, London.
- Grosh, M., and Munoz, J. 1996, A manual for planning and implementing the living standards measurement study survey (LSMS). Working paper 126, World Bank.
- Henninger, N. 1998, Mapping and geographic analysis of human welfare and poverty: Review and assessment. World Resources Institute, USA.
- Hentschel, J., Lanjouw, J.L., Lanjouw, P., and Poggi, J. (1998). Combining census and survey data to spatial dimensions of poverty. Working paper 1928, World Bank. <<http://www.worldbank.org/html/dec/Publications/Workpapers/WPS1900series/wps1928/wps1928.pdf>>.
- Liou, J.I. 1999, Temporal support for land information system in object-oriented modeling. Ph.D Thesis, Royal Institute of Technology, Sweden.

- Liou, J.I. 2001, Supporting geo-workflow management through object activity model. Journal of the Korean Association of Geographic Information Studies, Vol. 4, No. 2.
- Markandya, A., 2001, Poverty alleviation and sustainable development: implication for the management of natural capital. Working paper, International Institute for Sustainable Development.
- Moody, D. and Walsh, P., 1999. Measuring the value of information: An asset valuation approach. 7<sup>th</sup> European Conference on Information System (ECIS'99), Copenhagen.
- Narian, P. 2001. Agri-Environmental Statistics for compilation of indicators, accounts and meeting other needs of decision makers, Fourth Sub-regional Training Workshop on Environment Statistics, Bangkok.
- Sehlin, J., and Bodin, J. 1996. Poverty mapping, Project report of Poverty Assessment Study Survey (PASS) Zimbabwe.
- Selebalo, Q.C. 2001, Land reform and poverty alleviation: Lespitho's experiences during the last two decades. Proceedings of SARPAN Conference on Land Reform and Poverty Alleviation, June 4-5, 2001, Pretoria, South Africa.
- Sibanda, S. 2001, Land reform and poverty alleviation in South Africa. Proceedings of SARPAN Conference on Land Reform and Poverty Alleviation, June 4-5, 2001, Pretoria, South Africa.
- Spink, A., and Cole, C. 2001, Information and poverty: information-seeking channels used by African-American low-income households. Journal of Library & Information Science Research, No.23, pp 45-65.
- Sowa, J.F., and Zachman, J.A. 1992, Extending and formalizing the framework for information systems architecture. IBM Systems Journal, Vol. 31 (3), pp. 590-616.
- Swaminathan, M.S. 2000, Community-led approaches to ending food insecurity and poverty. Working paper, International Fund for Agricultural Development.
- UNDP, 2001, Choices for the Poor: Lessons from national poverty strategies. <<http://www.undp.org/dpa/publications/choicesforpoor/ENGLISH/index.html>>.
- Westoff, C. 2000, DHS (Demographic and Health Survey) Analytical Surveys: The substitution of contraception for abortion in Kazakhstan in the 1990s. DHS Analytical Studies No. 1 Calverton, Maryland: ORC Macro.
- World Bank, 2001, World Development Report; Attacking poverty, World Bank, Washington, DC.  
<<http://www.worldbank.org/poverty/wdrpoverty/report/index.htm>>.

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