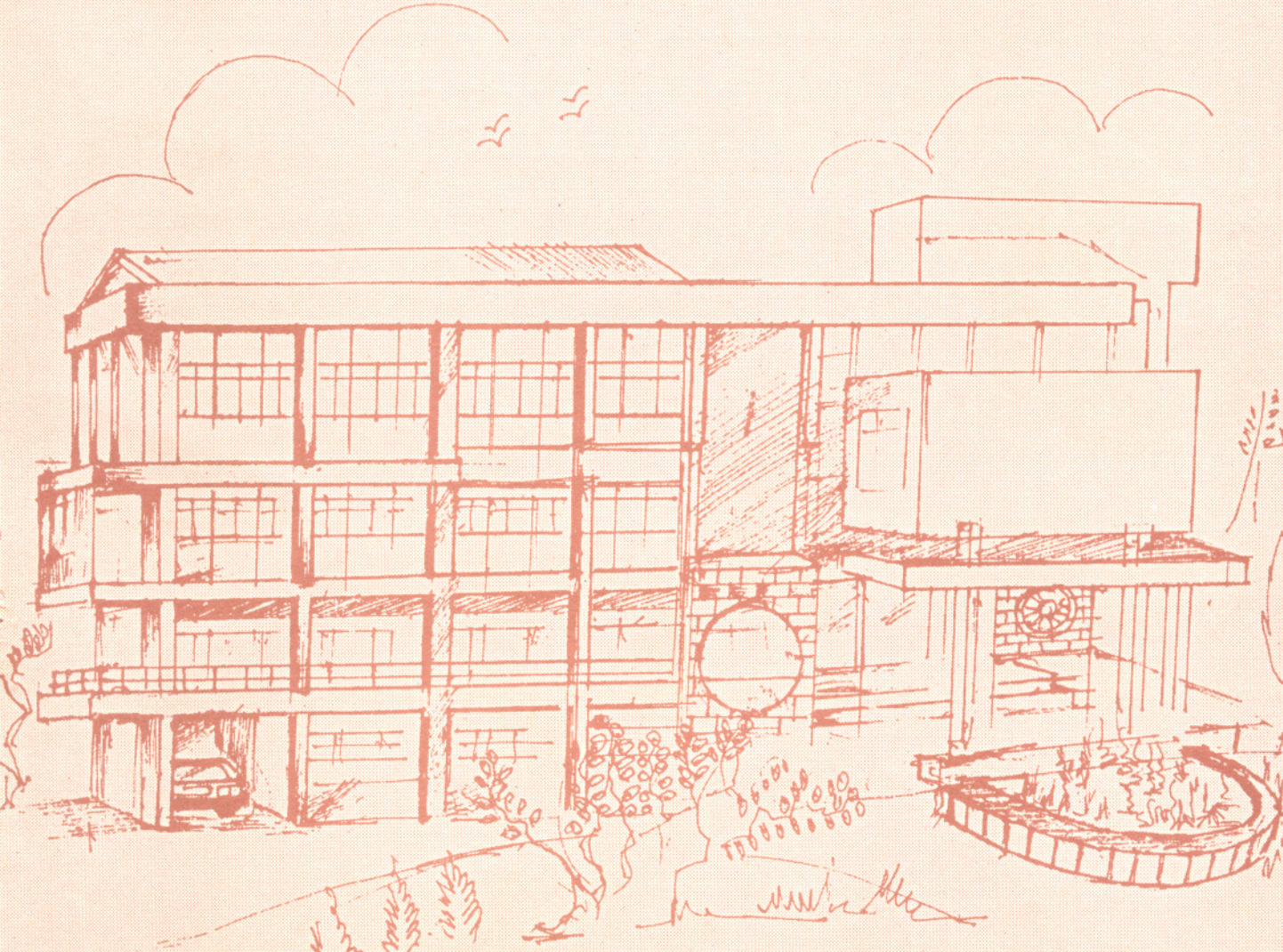
TAPMI
values and vision in management education
न हि ज्ञानेन सदृशं पवित्रमिह विद्यते

No. 38

Working Paper Series

Indigenous Knowledge and Fast Moving Consumer Goods – Are we seeing some tradeoffs?



Indigenous Knowledge and Fast Moving Consumer Goods – Are we seeing some tradeoffs?

Bino Paul
Assistant Professor
T.A. Pai Management Institute
Manipal - 576104
Karnataka, India.
Email: binopaul@mail.tapmi.org.

&

K. Sankaran
Professor
T.A.Pai Management Institute
Manipal-576104
Karnataka, India.
Email:sankaran@mail.tapmi.org.

TAPMI WORKING PAPER SERIES NO. 2005/ 01

The objective of TAPMI working paper series is to help Faculty members of TAPMI to test out their research ideas/findings at the pre-publication stage.

TAPMI

T. A. Pai Management Institute
Manipal –576 104, Udupi Dist., Karnataka

Indigenous Knowledge and Fast Moving Consumer Goods – Are we seeing some tradeoffs?

The paper explores the role of Indigenous Knowledge (IK) and bio-diversity as positive growth leveraging factors. In trying to do this we examine how the growth of Fast Moving Consumer Goods (FMCGs) adversely affects regional knowledge systems and bio-diversity. While the discussion is confined to FMCGs, it may have application to other non-durable goods too.

From the investors' perspective, FMCG sector is the source of high and stable return. There has been enormous growth in market size over the last decade. We postulate that the growth of a sector like FMCG is a threat to local production systems using organic inputs and indirectly to the overall regional growth.

In countries like India, villages have their own indigenous-organic solutions like beverages, balms, chutneys, medicines etc. There are thousands of varieties of solutions even after applying the criterion of parsimony. These solutions are well supported by local knowledge system and conservation values.

Through simple diagrams we show the approach towards conceptual modeling of the trade-off between FMCG and IK.

In trying to link this paper with future work, it suggests that there is a need for a more pro-active policy to specify indigenous product standards and disclosure norms. There is also need to come up with alternative business models to tap the indigenous knowledge systems and creation of incentives for bio-diversity conservation and local knowledge preservation.

Key words**: Indigenous Knowledge, Bio-Diversity, Growth, FMCG**

Indigenous Knowledge and Fast Moving Consumer Goods –

Are we seeing some tradeoffs?

I. Introduction

Knowledge is one of the sources of economic growth. The domain of economics of knowledge consists of major areas or sub-domains like knowledge embedding, new combination of existing ideas and production of knowledge, knowledge as public good and a factor of production, taxonomy of knowledge etc. Long ago, Adam Smith had recognized the significance of knowledge embedded artifacts as effective means of enhancing the scope of division of labour as growth engine (Smith, 1776). A recent study extends the scope of knowledge embedding to institutions, and corroborates Smith's explication of knowledge embedding-growth nexus *(Langlois, 2001)*. Economics of knowledge is greatly benefited by neo-classical growth theorists with their concepts such as Total Factor Productivity (TFP) or Solow Residual (*Solow, 1956*). Empirical estimates of TFP lend evidence to the postulate of knowledge being a source of economic growth. Realizing the potential of knowledge as a major source of growth, more research have been carried out on modelling issues like specifying knowledge as public good (*Arrow 1962*).

With the later development of endogenous growth theory, investigation on knowledge-growth causality gained more theoretical rigour (*Romer 1990*). Schumpeter's perception of knowledge as new combinations of existing means of production, noted for its uniqueness and deviation from neo-classical specifications, is upheld by economists like Weitzman (1998). Weitzman broadened the concept of 'knowledge as combination' by introducing 'germinal ideas' and its production function. Even more recently, Cowan et al. (2000) conceives knowledge activity as a historical and behavioural process in line with Kuhn (1970).

Conceiving knowledge as capability seems to be a more prudent and holistic option than confining it to as a production function. Capabilities, as conceived by Sen (1992) reflect freedom of the individual. As an individual capability, knowledge enhances freedom. Indigenous Knowledge (IK) is a subset of the knowledge space, and therefore it deserves to be addressed as capability of an individual or region (Besides IK, the domain of regional capability consists of income, extrinsic value of land etc.). The capability configuration is important because it influences the stability of the regional economic system. Unlike codified-formal sciences, IK is rather tacit and is often embedded in artefacts, human values and institutions. IK-based systems, be it production or consumption function of a household or a region, are intertwined with biodiversity and its conservation. This linkage to bio-diversity is because IK based systems unequivocally incorporate organic resources. IK may be useful in unravelling local bio-diversity, especially information content of the species. Hence, IK-biodiversity nexus has often been explored for addressing public policy questions like food security, health, water harvesting etc (Swaminathan, 1999). Some of the pharmaceutical firms were immensely benefited by IK, and the same holds good for academic research.

A priori reasoning would suggest that enhancing market size of IK applications would encourage people to preserve bio-diversity and conversely depleting IK stock is capable of adversely affecting preference for bio-diversity conservation (BC). Further, depletion of IK stock of a region is often influenced by factors like penetration of synthetic substitutes. Often, synthetic substitutes find their way to human consumption through Fast Moving Consumer Good (FMCG) brands. Through such means depletion of IK can constrain the prospects of attaining the region's potential endogenous growth.

The IK-BC based growth trajectory demands daunting task of reengineering the value space, usually dominated by exchange value. There has to be a movement away from this exclusive domination of exchange value to incorporate other forms of value such as use value, option value and existence value. The study of IK-BC

trade-off, FMCG penetration and local preferences, regional capability configuration and other determinants can give insights on possibilities and limits of IK-based endogenous growth model.

This paper seeks to examine and outline the theoretical link of IK base as a focal aspect of indigenous capability formation, which has significant bearing on regional and rural development process.

Section II outlines theoretical background of economics of knowledge, conceptualization of Indigenous Knowledge-Bio-Diversity nexus and it's potential as source of economic growth and perceiving knowledge as capability. Section III deals with theorizing of welfare implication of Fast Consumer Goods (FMCG) and the potential impact on IK and Bio-Diversity. Finally, section IV is devoted to concluding observations which could be basis for an in depth study on the topic.

II Theoretical Background

Knowledge and Economic Growth

Significance of knowledge, as one of the sources of growth, has been recognized by generations of economists from Classical School to the school of Endogenous Growth Theorists. Economists' exploration of sources of economic growth was influenced by ideas such as stock of information, state of art etc. Adam Smith, while specifying division of labour as a growth engine paid due respect to knowledge and held that the success of division labour, to greater extent, depends upon the process of Knowledge-embedding. According to Smith, knowledge embedded artefacts are essential for sharpening dexterity, which propels growth.

On examining the process of economic development, Schumpeter (1912) laid emphasis on innovation. He put forth that new combination of existing means of production, representing knowledge, causes 'spontaneous and discontinuous' change. Unlike Neo-Classicists, neither Adam Smith nor Schumpeter felt the pressure to be confined to 'heroic' assumptions and equilibrium constraints. They

were more interested in identifying growth engines. While Smith suggested division of labour as prime growth propeller, for Schumpeter, it was innovation. Various empirical studies have shown that capital and labour cannot entirely explain the changes in growth in value. The unexplained component is known as Solow Residual (i.e. TFP). Empirical research on sources of growth, especially TFP estimates, corroborates the significance of Solow Residual being an important source of growth (World Development Report, 1998). However, the notion 'endogeny of knowledge' challenged traditional growth formulations, which consists of neo-classical and Harod-Domar approaches. This generic term 'traditional' indicates investment-centric growth models. Endogenous growth theorists have gone further; they treated knowledge as a factor of production (*not as manna from heaven*); their models are superior to neo-classical theories in terms of modeling the knowledge and in explaining technological change (Romer 1990; Kremer 1993; Jones 1995).

One step further, for Weitzman, knowledge production is the function of new recombination of old knowledge. This notion is compliant with Schumpeterian tradition. Dispelling the pessimism of limits to growth perception, he buoyantly put forth:

> "Ultimate limits to growth may lie not so much in our abilities to generate new ideas, as in our abilities to process to fruition an ever-increasing abundance of potentially fruitful ideas" (Weitzman, 1998_a).

Conceptualization of Economics of Knowledge

Defining knowledge may appear sound, but it demands exhaustive an survey of epistemology. Keeping in mind our research objective, traversing the epistemology does not seem neither required nor feasible. Russel (1962) reflects upon how amorphous any definition of knowledge would be:

> "Knowledge might be defined as belief which is in agreement with the facts. The trouble is that no one knows what a belief is, no one knows what a fact is, and no one knows what sort of agreement between them would make a belief true."

Economist, while not interested in defining knowledge per se, were more interested in certain properties of knowledge. For instance, these properties included knowledge being commodity (*Arrow 1962; Romer 1990*), production of knowledge as the function of productive ideas (*Weitzman 1998*) and stipulation of the taxonomy of knowledge (*Cowen et. al 2000*). Arrow assumes that an increase in Capital necessarily leads to proportionate increase in knowledge through learning by doing. This implies that knowledge is a public good. However, endogenous growth theorists like Romer defy the assumption of knowledge being a public good. Romer postulates knowledge as a non-rival, but partially excludable good. According to this postulate, growth is led by the accumulation of partially excludable, non-rival inputs. This situation is quite realistic. Romer cites the case of design:

> "The design is non-rival but the ability to add is not. The difference arises because the ability to add is inherently tied to a physical object (a human body) whereas the design is not." (Romer, 1990)

The major advantage of Romer's approach is that it enhances the scope of theorizing knowledge spill-over and ensuing economic growth. Following Romer, Weitzman, while hypothesizing endogenous growth model, characterizes knowledge as a number of germinal ideas.

> "A germinal idea has the potential of combining with other germinal ideas to produce yet more germinal ideas". (*Weitzman 1998*)

Schumpeterian tradition, especially evolutionary economics, has greatly influenced the concept of germinal ideas. The taxonomic approach of classifying knowledge into tacit and explicit, which gained currency among economists, is a major departure from Romer and Arrow (*Cowen et al, 2000*). Codifiability of the

knowledge is the criterion of classification; explicit knowledge is codified whereas tacit is not. Codified knowledge is knowledge that can be converted into symbols for easy transmission, replication and storage (*Langlois 2001*). Tacit Knowledge stands for the aspects of human intelligence that cannot be replicated by any algorithm (*Nelson R & Sidney 1982*). Codified knowledge is further divided into articulated and unarticulated (*Articulation implies expression*). Codification is a necessary condition for articulation of knowledge. Articulated knowledge is necessarily codified, whereas codified knowledge may be unarticulated. Another major postulate of taxonomic approach is that the codified knowledge is relative; codified knowledge for some people may be tacit for others. The process of codification depends upon economic incentives being expected. Despite being codifiable, some knowledge may remain tacit; perhaps inadequacy of economic incentives is a major reason for this. Codified knowledge enhances generality; and it augments potential of reuse of knowledge. The taxonomic approach has been successful in framing economics of knowledge and explicating codification-economic growth relationship. However, the taxonomic approach has been criticized by Langlois for excluding embedded knowledge from the purview of knowledge accounting (Langlois 2001). According to him, codification is not the only way of enhancing the generality of knowledge and making knowledge less idiosyncratic. Institutions and networks are also capable of doing the same. Knowledge embedded institutions, through standardization and coordination of agents' behaviour, area also sources of convexity. He says that the knowledge is embedded in terminology, procedures and artifacts. Adam Smith too had highlighted the role of knowledge embedded artifacts in accelerating the pace of production. Both theories, taxonomic and Langlois's, have merits over Romer and Arrow; their domain and conceptualization of knowledge are more insightful than latters' concept of knowledge being aggregate information having properties of public goods or quasi public goods. In summary, Langlois idea of knowledge can best be encapsulated through what Boulding said long ago:

> "We cannot regard knowledge as simply the accumulation of information in a stockpile, even though all messages that are received by the brain may

leave some sort of deposit there. Knowledge must itself be regarded as a structure, a very complex and frequently quite loose pattern" (*Boulding K. E. 1955 cited in Langlois 2001*).

Indigenous Knowledge

As examined in previous section, the relationship between knowledge and growth is supported by various theories of economic growth. Knowledge, along with income and other relevant values, deserves to be addressed as capability of the region. Knowledge, codified or not, unique to a region belongs to the capability set. This knowledge is called local knowledge or Indigenous Knowledge (IK). Some of the views identify indigenous knowledge as local ones (*Warren 1991, IIRR 1996, Grenier 1998*). Grenier's definition seems to be more appropriate to our context:

> "(Indigenous Knowledge) is the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area." (*Grenier, 1998)*

International Institute of Rural Reconstruction (IIRR), dispelling the misconceptions of IK being specific to tribal, points out the following:

> "The knowledge that people in given community have developed over time, and continue to develop indigenous knowledge is not confined to tribal groups or the original inhabitants of an area. It is not even confined to rural people. Rather, any community possesses indigenous knowledge - rural and urban, settled and nomadic, original inhabitants and migrants. Other names for indigenous knowledge (or closely related concepts) are 'local knowledge', 'indigenous technical knowledge' and 'traditional knowledge' " (*IIRR, 1996*).

Indigenous Knowledge Bio-Diversity Linkage

What emerges from IIRR contribution is a typology with the two axes being Region and Community. Further, IIRR also suggests that biodiversity related information is the major source of indigenous knowledge (*IIRR, 1996*). This implies the nexus between IK and bio-diversity. How do we perceive biodiversity in this context? It is the information content of the species (*Weitzman 1998; Metrick & Weitzman, 1998*). IK and related information systems are abound with such critical information. Some of the American enterprises have combined IK and science for innovating products (*Bierer et al., 2000*). It is not an overstatement that IK and bio-diversity related information have great business potential. This is well evident in the ecologists' observation

> "Good information on Bio-Diversity resources of the country, organized and managed through a reliable, financially self-supporting system could catalyze the growth of bio-diversity based enterprise for India." (*Gadgil and Rao, 1998*)

There have been attempts towards harnessing such business potential direction. Gujarat Grassroots Innovation Augmentation Network (GIAN) has attempted to set up venture capital fund for IK based innovations. It provides for ventures linking up R&D initiatives and scaling up operations into viable enterprises (*Anil K. Gupta, 1999*). Eco-technology perspective is another major attempt to harness the benefits of IK (Swaminathan, 1999). Documentation of IK and verification of IK against formal science seem to be crucial in the context of Intellectual Property Rights Regime. Issues like bio-piracy strengthens the urgency of our point (*Shiva Vandana, 1997*).

The IK-Bio-Diversity nexus demands redefining of traditional value space, which is currently dominated by exchange value. New space should incorporate exchange value, use value, existence value, and option value (*Gale 2000, Krutilla 1967, World Development Report 1998/99*). Use value means utility of a particular object. Some

authors have preferred to use the expression 'value in use'. Exchange Value on the other hand is the purchasing power of a particular object. Here, price reflects the exchange value. This is also known as value in exchange.

The third type of value, i.e. Existence value, is the benefit an individual or society receives from merely knowing that a good or service exists; this is a non-consumptive, non-excludable benefit. A typical example would be monuments. Finally, option value is based on knowledge about future possibilities and expectations. Option is a powerful reasoning for justifying the valuation of opportunities that do not have apparent present use and exchange values. If option value is positive, it points towards postponement of decision to consume, and therefore conserve.

Exchange value fetishism is a major historical factor detrimental to bio-diversity and, probably, even responsible for extinction of some of the species. A recent observation corroborates our concern:

> " Our planet has experienced five periods of mass extinction in which at least 17% of all existing taxonomic families were lost….. We are likely to lose between 25 and 50 % of all current species during the next century" (*Morell 1999*).

The rationality of bio-diversity conservation may not require further substantiation. There have been academic debates on valuation criteria of conservation (*Clark 1973, Barnes 1996, Alexander R A 2000*). Clarck (1973) argues the primacy of consumptive benefits in the cost-benefit calculus of conservation efforts. However, more recent empirical research by Barnes (1996) challenge Clark's valuation criterion; the study, citing the case of ban on ivory trade in Botswana, points out conservation efforts, be it through legislation or institutions, may increase the stream of non-consumptive benefits. After the ban on ivory trade, the share of non-consumptive benefits, out of total use value, have increased from 44 % to 77 %.

Reengineering of value space, incorporating consumptive value, exchange value, and other non-exchange values, requires incorporation of indigenous knowledge. Eco-tourism is an ideal example for value space reengineering. Pragmatism would suggest linking of livelihood and Bio-Diversity conservation for the sustainability of public policy frame; the cost-benefit calculus needs to incorporate livelihood-conservation linkage scale (*Salafsky. N, Wollenberg E, 2000*). The Salafsky and Wollenberg present five dependency scenarios: species dependence, habitat dependence, spatial dependence, temporal dependence and conservation association. Ordinal scale is used for measuring linkage intensity of each of these dimensions. IK information systems and Bio-Diversity Conservation, supported by appropriate institutions and incentives, have the potential of becoming an important source of economic growth of the region. However, growth of Fast Moving Consumer Goods (FMCG) sector threatens the very existence of IK-bio diversity trade off and built-in incentives; this has been analyzed in section III.

Indigenous Knowledge and Bio-Diversity as Regional Capability

Capabilities reflect freedom of an individual (Sen 1992). The concept of capabilities may be useful in the investigation of economic growth of a region, be it watershed or grama panchayat. Bio-diversity, linked to livelihood and being embedded in IK, deserves to be treated as capability along with IK. A convenient taxonomy would classify regional capabilities into three: (a) Income (b) Extrinsic Value (EV) driven access to infrastructure and (c) Indigenous Knowledge and Bio-Diversity. Balanced regional growth requires certain symmetry in the movement of components of capability set. Conflict among capabilities quite often crops up. For example, an increase in EV, due to better access to infrastructure and public goods, enhances liquidity of land as an asset; people may not have much incentive to think of bio-diversity and allied knowledge systems. Recent literature, showing sensitivity of Income to knowledge adoption among rural community in Madhya Pradesh, lends evidence to conflict in capability space (*Brodt S. B, 2000*). Tracing the interdependence among capabilities is important for suggesting a prudent public policy frame for Bio-diversity and IK. The endeavors, like bio-diversity

conservation, are also crucial for satisfying welfare norms like intergenerational equity and sustainability (*Anand S. & Sen A., 2000*). A recent study, citing Kerala's achievement in human development, observes the role of IK and related institutions in achieving sustainable human development (*Alexander W M, 2000*). According to Alexander, Kerala's achievement in human development, in comparison with developed countries, is more sustainable thanks to low consumption of earth resources; and IK is responsible for this.

III. Fast Moving Consumer Good Sector, IK and Bio-Diversity

Fast Moving Consumer Good Sector in India

From the investors' perspective, Fast Moving Consumer Goods (FMCG) sector is the source of high and stable return, and there has been enormous growth in market size over the last decade. A consumer good is fast moving when it is purchased frequently with little planning or shopping effort. FMCG are low priced and widely distributed. Toiletries, detergents and beverages are examples for FMCG (Kotler P & Amstrong G. 1999). Table 1 gives a comparison of overall manufacturing sector and major FMCG in terms of profitability, advertising and selling cost ratios. It appears from Table 1 that profitability (measured either as Profit after Tax over Capital employed and Profit after Tax over Net Sales) of FMCG are more than that of the entire manufacturing sector. The cosmetics- toiletries sector is having the highest profitability ratio. This particular sector has highest selling cost ratio.

Even with certain limitations with the information being somewhat dated and inadequate evidence for data being representative of the entire manufacturing sector, some further implications can be drawn. Among FMCG, cosmetics and toiletry has the highest profitability, and this sector happens to have highest selling costs and advertising expenses (both as percentages of net sales). The growth of this sector, it appears, is highly dependent on brand promotion. Given that in India rural market accounts for a huge percentage of the total market (see Table 2), the adverse impact of FMCG on bio-diversity and IK may be quite significant. In the backdrop of huge

increase in consumption of FMCG during the decennial 1985-86 and 1995-96, as indicated by Table 3, our concern may be well founded.

Market Penetration: Some Welfare Implications

The increasing rural penetration of FMCG is likely to be a serious threat to local production systems based on organic inputs, if the technology does not absorb organic inputs and local resources. In India, there are more than five lakh hamlets/villages. These villages have indigenous solutions like beverages, balms, medicines etc. This may run into more than thousands of varieties of solutions even after applying the criterion of parsimony. These solutions are well supported by local knowledge systems and conservation values. Market-mix optimization programs of FMCG often give ascendancy to rural market penetration strategies. Advertising creates brand awareness, and this influences decision calculus of household. Statistics show that, for most of the FMCG, cultivators constitute more than one fourth of purchasers (table 5). Brands will be substituted for local ones. A large-scale penetration of FMCG into rural market is capable of depleting knowledge stock, resulting in lesser incentive for conservation of resources (including Common Property Resources) and value creation in the rural areas. The preference for branded goods is well explained by factors like relatively elastic supply of products at competitive price, value formation in favour of brand as the benchmark of modernity and brand awareness through advertising. Raw materials for indigenous solutions are locally available natural resources and processing is often based on indigenous knowledge. The brand penetration can adversely affect the feasibility of natural resource based knowledge systems. Thus, brands act as a disincentive for conserving biodiversity and knowledge systems.

FMCG-Bio diversity Trade off

The trade-off between FMCG brands and bio-diversity shall be explained with the help of a set of production possibility curves. Bio-diversity in the present analysis refers to information content of the species. Information content is the probability that at least one species survives, and it contains information of some utility. Here,

we try to trace the evolution of product mix and the nature of exchange in a regional context. The spatial unit of our analysis is region 'i'. During the period T_0, product mix (A) consists of production for surplus (X) and production for subsistence (Y) (figure 1). Exchange of goods and services during this period is at a nascent stage. We assume that major productive activity in this area is cultivation. The production function is subject to the law of diminishing returns. In the absence of well-defined market and expectations about future returns, producers have very little incentive for producing surplus. However, less risk-averse and more futuristic producers may opt for intensive farming and produce surplus, and many agents will produce surplus in due course of time. For each additional unit of surplus production, more subsistence output is to be sacrificed. The preference for subsistence farming is evaluated in terms of leisure time it provides to producer. Surplus produce based on intensive farming is likely to reduce leisure time of producer. With more farmers switching over to surplus production, product mix during the period T_1 is B. The shift of product mix from A to B is likely to have little impact on land utilisation pattern of the region. Due to expensive storage and other logistic reasons, producers may want to release their surplus stock. For this, the market has to be enhanced. They will go for inter-regional or intra-regional trade. The other regions also will have similar transformation and they compete each other. Ultimately they realise their comparative advantages and specialise in certain commodity/Commodities, say, X (Figure 2). This happens in period T_2. Henceforth the problem of choice is between specialised production (X) and products incorporating bio diversity (Z), and C represents product mix. To cater to the needs of market, producer will switch over to extensive farming; more lands will be brought under cultivation. Some of the producers will switch over to chemical intensive farming. However, producers have still some incentive for preserving flora and fauna diversity because the consumption function incorporates benefits from bio-diversity. At least they preserve informational content of the species.

Several regions follow the suit of 'i', and national product grows along with enhancing market. Large market size attracts FMCG brands. Brands will try to tap latent rural demand. With the Penetration of FMCGs, production possibility curve

shifts towards right. The stock of Z declines; this happens in period T_3. There will be less incentive for preserving diversity. New product mix D represents this (Figure 2). The broader implication our analysis is that the growth happens at the cost of diversity and information content (Figure 3). Real National product grows over the time. However, bio-diversity declines during the period T_2-T_3. Specifying product standards is prudent way of minimizing externalities due to FMCG brands. The task of policy would be to specify product standards ensuring incentives for conservation of bio-diversity and IK. This calls for appropriate institutions specifying product standards. Local institutions like co-operatives can be a possible organizational arrangement for quality verification and assessment. Belussi's remark is appropriate to our context:

> "Local institutions have played an important role in the setting of some general rules embodied in local context…. An other important nature has been the accumulation and mobilization of knowledge, supporting collective learning, a process in which both markets and institutions have played a crucial role" *(Belussi, F. , 1999).*

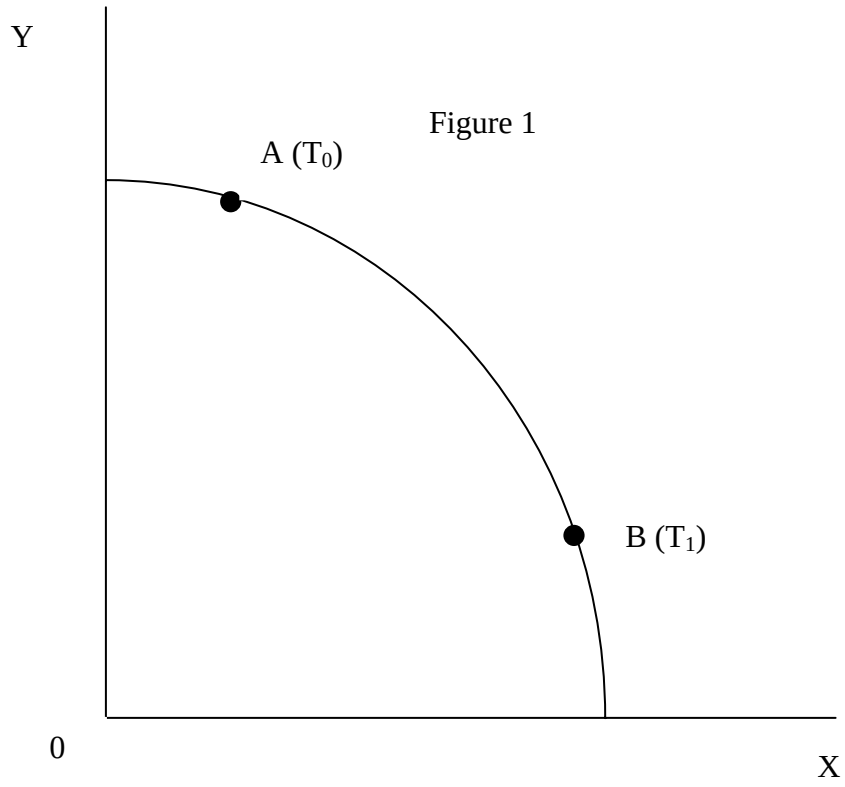


Figure 1

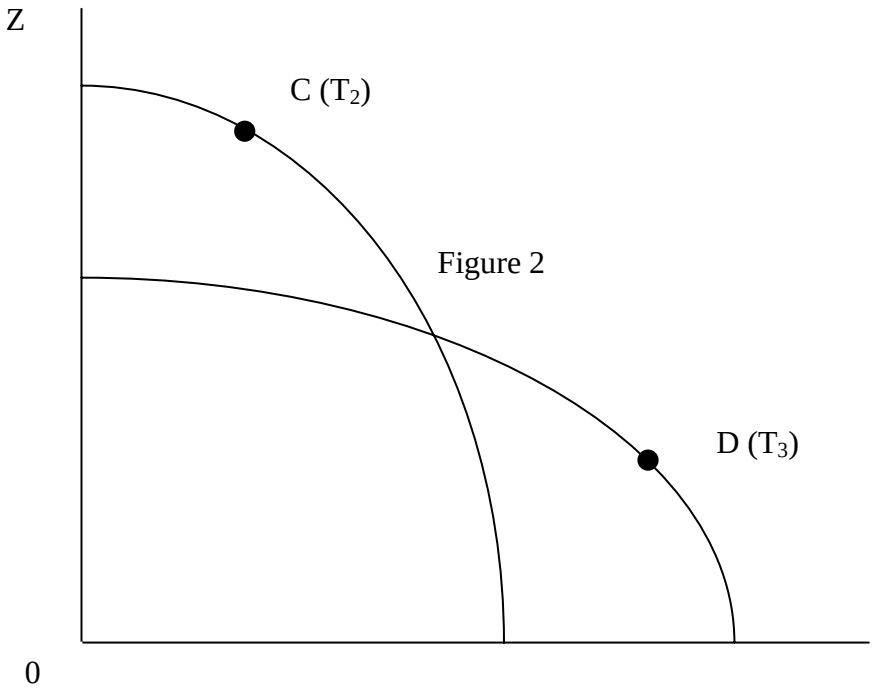
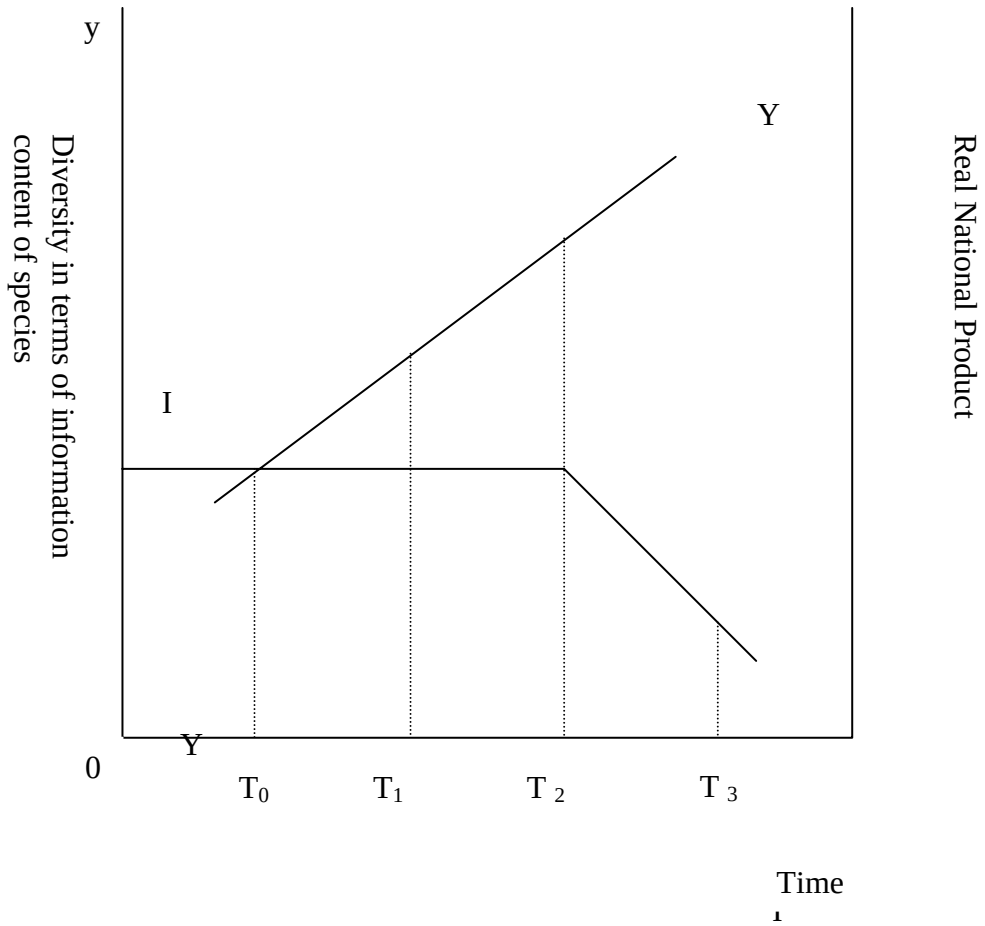


Figure 2

Figure 3



YY = Real National Product

I I = Diversity

Table 1:Sales, advertising selling cost ratios, profitability ratio and Wage Ratio (1997-98)

	Gross Sales	PAT/CE	PAT/NS	SC/NS	AD/NS	W/NS
Food products	29794.7	3.6	2	5.1	1.4	4.6
Beverage and tobacco	13958.1	13	8.1	11.4	5.8	4.9
Soaps and Detergents	3010.0	11.6	6.8	5.6	2.8	3.7
Cosmetics and Toiletry	3432.1	18.9	8.6	13.7	10	3.9
Manufacturing (total)	576378.6	2.6	2	7.9	0.8	5.2

Gross sales in Rs. Crore PAT = Profit After Tax CE = Capital Employed

SC = Selling Cost Ad = Expense on Advertising W = Wages and Salaries

NS = Net Sales Note: All ratios are expressed in percentages

Source: Eonomic Intelligence Service, Center for Monitoring Indian Economy, Industrial Financial Aggregate Ratios, 1999

Table 2: FMCG Rural Penetration Rates (purchasing Household per ‘000 households)

	1985-86	1989-90	1995-96
Talcum powder	351.6	340.2	368.5
Cigarettes	136.5	207.1	186.8
Hair oil/Cream	529.7	657.6	731.4
Health Beverages	23.5	28.0	51.6
Packaged Biscuits	145.2	182.7	231.1
Toilet soap	816.2	844.1	949.2
Tooth Paste	184.6	211.9	329.7
Tooth Powder	315.9	330.9	370.3
Washing Cake	839.2	930.4	918.2
Washing Powder	373.7	445.8	553.7

Source: Compiled from Indian Market Demographics Report, NCAER, 1998

Table 3: Purchase of FMCGs - Rural Share (%)

	1985-86	1989-90	1995-96
Body Talcum powder	47	46	43
Hair oil/Cream	48	43	47
Health Beverages	35	31	32
Packaged Biscuits	55	46	38
Toilet soap	51	50	57
Tooth Paste	29	30	39
Tooth Powder	66	67	79
Washing Cake	61	68	68
Washing Powder	43	48	55

Source: Compiled from Indian Market Demographics Report, NCAER, 1998

Table 4: Growth of FMCG Consumption (Rural + Urban)

	1985-86	1989-90	1995-96
Talcum powder (‘000 tonnes)	9	11.9	16.43
Cigarettes (Millions)	970.6	670.0	742.44
Hair oil/Cream (Rs. Million)	2100	3186.9	8983.33
Health Beverages (‘000 tonnes)	24	23.0	62.54
Packaged Biscuits (‘000 tonnes)	132	295.0	483.84
Toilet soap (‘000 tonnes)	227	327.0	606.27
Tooth Paste (‘000 tonnes)	16	39.61	56.62
Tooth Powder (‘000 tonnes)	5	15.00	28.13
Washing Cake (‘000 tonnes)	830	1074.00	1325.21
Washing Powder (‘000 tonnes)	515	709.00	1104.27

Source: Compiled from Indian Market Demographics Report, NCAER, 1998

Table 5: Purchase of FMCGs – Occupational Distribution 1995-1996

	Cultivator	Wage earner
Body Talcum powder	21.94	16.49
Cigarettes	29.16	19.8
Hair oil/Cream	22.42	23.65
Health Beverages	18.47	8.44
Packaged Biscuits	21.11	14.21
Toilet soap	26.56	24.91
Tooth Paste	21.08	15.89
Tooth Powder	36.17	33.19
Washing Cake	29.97	27.76
Washing Powder	26.91	23.52

Source: Compiled from Indian Market Demographics Report, NCAER, 1998

IV. Conclusion

Our analysis of major epistemological developments in economics of knowledge indicates qualitative and quantitative dimension of theorization endeavours; there has been definite improvement in the methodology of economics of knowledge. Taxonomy of knowledge, feature of the present epistemological phase, eases the task of limiting the analytical space, and we are equipped to perceive an appropriate taxonomy for IK. Various schools specify causal link between knowledge and economic growth. By extending the same reasoning, conjecturing IK-economic growth nexus is a plausible exercise. We have tried to understand interdependence between IK and bio-diversity and its economic significance; natural corollary of this bond is conservation of bio-diversity and new value space. Identifying IK, as an element of capability set of the region, is crucial in value space reengineering, and conflicts among capability elements may alter the growth trajectory of the region. Capability configuration and modelling the appropriate synchronization mechanism

are major theoretical challenges. The analysis in section 3 explains how FMCG thwart the very existence of IK and bio-diversity. Growth formulations, specifying IK as growth engine, are capable of resisting the FMCG penetration to rural market. Bridging above concepts –IK, bio-diversity, economic growth, new value space-calls for appropriate organizational setting and institutions; enterprise must be able to generate incentives, and this is the justification for thinking of bio-diversity service enterprise.

Reference

Alexander Robert A. (2000), "Modelling Species Extinction: The Case for Non-consumptive values", *Ecological Economics*", 35, 259-269

Alexander, William M. **(2000)** "Gender Matters: Place Located Indigenous Knowledge Finding the Value of Per Capita Earth Resource Consumption Necessary for Human Sustainability", Oregon State University,

Anand S., & Sen A. (2000), "Human Development and Economic Sustainability", *World Development*, vol 28, No 12 pp 2029-2049

Arrow, Kenneth J. **(1962)** "The Economic Implications of Learning by Doing." *Review of Economic Studies* 29: 155-73

Barnes J. I. (1996), "Changes in the Economic Use Value of Elephant in Botswana: The Effect of International Trade Prohibition", *Ecological Economics*, 18, 215-230

Belussi, F., (1999), "Policies for the Development of Knowledge-Intensive Local Production Systems", *Cambridge Journal of Economics*, 23, pp 729-747

Boulding, Kenneth E (1955), "Notes on Information Concept", *Explorations*, Toronto, 6: 103-112

Brodt S. B. (2000), *Explorations into the Conservation of Indigenous Knowledge for Resource Management*, in Seeland K & Schmithusen F. (Ed), Man in the Forest, D K Printworld (p) Ltd, New Delhi

Center for Monitoring Indian Economy (1999), *Industrial Financial Aggregate Ratios*, Economic Intelligence Service

Clarck C. W. (1973), "Profit Maximization and the Extinction of Animal Species", *Journal of Political Economy* 81, 950-961

Cowan, R., Paul A. D., and Foray D. (2000), 'The Explicit Economics of Knowledge Codification and Tacitness', *Industrial and Corporate Change*, Vol 9, 2 pp. 211-253

Flavier, J.M. et al. **(1995**), *The regional program for the promotion of indigenous knowledge in Asia*, pp. 479-487 in Warren, D.M., L.J. Slikkerveer and D. Brokensha (eds) The cultural dimension of development: Indigenous knowledge systems. London: Intermediate Technology Publications

Gadgil, Madhav, **Rao**, **Seshagiri (1998)**, *Nurturing Bio-Diversity: An Indian Agenda,* Ahmedabad: Centre for Environment Education

Gale F. (2000), "Economic Specialization versus Ecological Diversification: the trade policy implication of taking the ecosystem approach seriously", *Ecological Economics* 34, 285-292

Grenier Louise (1998), *Working with Indigenous Knowledge*. A guide for researchers, New Delhi: IDRC

Gupta, Anil K (1999), *Strategy for Organic Agriculture; Creativity and Innovation and Developing Societies*, in Shivashankar K. (ed.), Food Security in Harmony with Nature: Proceedings of IFOAM-ASIA scientific conference, IFOAM-Asia and University of Agricultural Sciences, Bangalore.

IIRR. **(1996)**, *Recording and using indigenous knowledge*: A manual. International Institute of Rural Reconstruction, Silang, Cavite, Philippines

Jones Charles I (1995),. Time Series Tests of Endogenous Growth Models", *Quarterly Journal of Economics*, Vol. 110, no. 2 : 495-525

Kotler, P. and Armstrong G. **(1999),** *Principles of Marketing*, 8th edition, Prentice Hall of India Pvt. Ltd., New Delhi, pp 240-241.

Kremer, Michael, (1993), "Population Growth and Technological Change: One million BC to 1900", *Quarterly Journal of Economics*, 108, 681-716

Krutilla J. V. (1967), "Conservation Reconsidered", *American Economic Review* 57, 777-786

Kuhn, Thomas S. (1970), "The Structure of Scientific Revolutions" (2nd Ed.), Chicago: University of Chicago Press

Langlois Richard N. 2001 "Knowledge, Consumption, and Endogenous Growth," *Journal of Evolutionary Economics* **11**(1): 77-93, January

Metrick, Andrew and Weitzman, Martin, L (1998), "Conflict and Choices in Biodiversity Preservation", *Journal of Economic Perspectives*, Vol. 12, n0 3 pp 21-34

Morell, V., (1999), The Sixth Extinction, *National Geographic*, 195 (2), 43-56

National Council of Applied Economic Research (1998), Indian Market Demographics Report

Nelson, Richard R and Sidney Winter (1982), *An Evolutionary Theory of Economic Change*, Cambridge MA, Harvard University Press

Romer Paul M, (**1990)**, "Endogenous Technological Change", *Journal of Political Economy* , s 71 vol 98, number 5, part 2.

Russel, Bertrand (1962), The Encyclopedia Brittanica

Salafsky Nick and Wollenberg (2000), "Linking Lively hood and Conservation: A Conceptual Framework and Scale for Assessing the Integration of Human Needs and Bio-Diversity:, *World Development*, Vol 28, No 8, pp 1421-1430,

Schumpeter, J. A (1912), *The Theory of Economic Development*, Oxford University Press, (1980: print)

Sen, Amartya K (1992), *Inequality Re-examined*, Oxford University Press

Shiva, Vandana (1997), *Bio-Piracy-The Plunder of Nature and Knowledge*, Boston Mass: South end press.

Smith, Adam (**1776)**, *An Inquiry into the Nature and Causes of Wealth of nations*, Modern Library New York (1937 print)

Solow, R (1956), "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics* 70 (1), 65-94

Swaminathan M S (1999), *Eco-farming, the Pathway to an Ever-Green Revolution*, in Shivashankar K. (ed.), Food Security in Harmony with

Nature: Proceedings of IFOAM-ASIA scientific conference, IFOAM-Asia and University of Agricultural Sciences, Bangalore, first edition

Warren, D.M. (1991), "Using Indigenous Knowledge in Agricultural Development"; *World Bank Discussion Paper No.127*. Washington, D.C.: The World Bank.

Weitzman Martin L , (1998 a) " Recombinant Growth", *Quarterly Journal of Economics*, 1, Vol CX11 May

Weitzman, Martin, L., (1998 b), "The Noah's Ark Problem", *Econometrica*, 66, pp 1279-1298

World Bank 1998, *Knowledge for Development*, World Development Report, Oxford University Press.