

Social Metabolism: The Kinetics of Entropy and Osmosis in Transforming Farming System

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ABSTRACT

The creation, growth and decay of any social system, retaining myriads of life forms, have basically been the concerns and exposition of energy. Social Metabolism envisages a natural connectivity amongst physical, biological and social systems and their underlying cybernetics. It is the flow of energy that drives the social systems generating information, applying information and transforming the present social process into a desired social outcome. Energy remains retained, shelved and configured within a cell and within a social capsule and also is subject to a ruptured release for unleashing motivations and psychological capabilities. The present paper examines the collision and collusion between imposed technologies vis-a-vis extraneous knowledge vs. intrinsic vis-a-vis in situ knowledge. The rejection of innovation, prescribed by experts, has got a reverse osmosis impact in the entire technology socialization process.

Key words: Social Metabolism, Entropy and Osmosis, Farming System

INTRODUCTION

The history of ten thousand years of agrarian civilization is basically the history of humane innovation to tame the nature and shape the life, the way we desire. From hunting economy to present day technology driven society, the role of human knowledge keeps getting exponential.

The conflict between indigenous and exotic knowledge is classical as well as ephemeral. This has become worst with the process of urbanization as well as modernisation in the very system of agricultural production and management. Our extreme hegemony in favour of making farmers adopting energy intensive technology and contra-ecological approaches has made a near disastrous situation, can be branded as an entropy of knowledge and technology.

Knowledge Conflict in Farming System and the Contra Adoption Process

The traditional and *in situ* knowledge are being contradicted by imported knowledge in agro-ecosystem, which again is undergoing constant reforms, adjustments and evolution. In

certain cases, where indigenous knowledge keeps offering a space for social osmosis, prescribed knowledge are assimilated and acculturated. In other cases, withdrawal and non-compliance are happening simply because the initial knowledge balance, characterizing a unique social echelon has failed to assimilate exotic knowledge. These all lead to a knowledge dissonance attributing to a negative social metabolism over a slice of temporal distribution.

The different aspects of knowledge dissonance and the crux of social entropy in farming system resource bases, enterprise pattern, household livelihood and constraints and for which similar development strategies and intervention can be applied. Farming system in India has been characterised with high level of adoption, rejection and discontinuance. Agriculture in India demands transfer of technology, external supply of inputs as well as knowledge, where rural people have become mere recipient of input and technology. In India in general and West Bengal in particular through the continuous imposing of knowledge and motivating the rural people a gap has been found between motivation unleashed and

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accomplished made and there is a gradual dissolving of the most advance societies due to intrinsic disorder that may be referred to as social entropy. This is responsible for institutional conflict, organizational disorder or social entropy. Social entropy is a macro-sociological system theory. It is a measure of the natural decay within a social system. It can be defined as the decomposition of social structure or of the disappearance of social distinctions. Social entropy is the amount of motivation unavailable for performing in system. Mitchel (2009) studied on a village (Jacobs) in 1998 through creative destruction developed and predicted the fate of communities that became the base of their development on the co-modification of rural heritage. You, L *et al.* (2006) while reporting agricultural production statistics on geopolitical and on national basis concludes that there is a need to know the status of production or productivity within specific sub regions, watersheds or agro-ecological zones. His study depicts entropy based approach to make spatially disaggregated assessments of distribution of crop production. Jen *et al.* (1999) in his multi-method field study of 92 work groups explored the three types of workgroups diversity (Social category diversity, Value diversity and informational diversity) and two moderators (task type and task interdependence) where these workgroups not only became central to organization but also presented their own intrinsic problem of coordination, motivation and conflict management.

Social Equilibrium, Rural Poverty and Flow of Energy

Therefore, keeping core periphery contradiction in the development process that has caused structured chaos and dissonance in view, the present research has been conducted for the prediction of the social entropy amongst the farmers from a score of socio-personal, socio-psychological and communication variation. Farming systems deals with production system and production function, it is load based, crop based, and natural resource base and thus crop productivity is a function of physical, biological and social subsistence. The stage of equilibrium, physical, biological and social is the prime concern

of any system, it is more important for extension system because it aims at adding disequilibrium to a depletive function e.g. (Poverty) in order to invite neo-equilibrium (sustainable livelihood).

Social Metabolism and Social Entropy

Every day an immense mass of the materials and the energy of nature are, through work activity, appropriated by the social body, only to be adapted to its needs, through production activity and distributed to the various parts through circulation, transformed into the social fabric by means of absorption (as for food) by both institutions and individuals, and returned into the lap of nature through the consumption of goods and bodily forces. Schaffle clearly outlined the mechanism of that social metabolism by means of which the energy and the matter existing in nature enables the social body to maintain itself. The economic and physiological exchange of material does not entail the destruction of the material and energy but, rather, it entails their re-organization into sources of energy and into institutions which make their social use possible. Basically, Schaffle applied thermodynamic principles to social exchange. According to this principle energy and matter are not destroyed but are only transformed, disorganised and then reorganised for other uses. An efficient mechanism of social metabolism can neither allow any energy to be lost nor permitting increasing entropy, would the result be crisis within the social organism itself. (Schaffle, A. 1874).

At certain stage of development, chemical process lead to formation of Protein body and on the basis of emergence of life i.e. to the biological form of motion of matter. It follows that some forms of motion of matter can turn into the other forms of motion of matter, which is reflected in the law of conservation and transformation of energy and matter. Each stage in the development of matter corresponds to a form of motion, differ qualitatively, and the highest forms of motion of matter cannot be reduced to the lowest.

Social Osmosis: The Science of Knowledge Exchange

Social osmosis is the indirect infusion of social, cultural knowledge. Effectively social control is diffused and by happenstance authentic

experience is displaced by degrees of mediated separation before a subject acquires knowledge of a social phenomenon (Raaj K. Sah, 1990).

Knowledge always undergoes a social osmosis process to exchange, imbibe and assimilate.

Knowledge Entropy in Farming System : Issues of Compliances and Conflicts

An empirical study was conducted to elicit the factors and reasons for non-compliance and conflict in the process of technology transfer, technology socialization either. In the study 73 respondents were selected randomly from 250 growers of village Ghoragaccha of Block Haringhata in Nadia district of West Bengal, India. Socio-personal variables like age (x1), Education (x2), Family education status (x3), Family size (x4), Cropping intensity (x5), Farm size (x6), Annual income in Rs/year/capita (x7), Socio-psychological variables like scientific orientation (x8), Independency (x9), Innovation proneness (x10), Risk orientation (x11), Economic motivation (x12), Orientation towards competition (x13), Attitude towards discontinuance (x14), Attitude towards rejection (x15), Communication variables like Social participation (x16), Utilization of source of information (x17), and

training received (x18) as predictors, whereas, among predicted or dependent variables, Noncompliance (Y1), Disagreement (y2), Conflict (Y3), Alienation (Y4) Social Entropy (Y5) were taken. Social entropy (y5) was obtained first by multiplying all the four predicted variables y1, y2, y3, y4 and then dividing the resultant product by 4.

Data were collected directly from the farmers with the help of structured schedule through personal interview methods. Collected data from the selected farmers were analysed with the help of several statistical tools like mean, standard deviation, coefficient of variation, correlation, regression and path analysis.

- A. The farmers having less innovation proneness are more vulnerable to entropy situation.
- B. With the increase of income the rural people, for certain cases, are showing increasing dissonance against proposed technology, might be, there are now more exposed to choice of alternatives than before. Stepwise regression and backward elimination techniques considering highest regression coefficient for social Entropy (Y5) as dependent variable and remaining 18 variables as predictors.

Table 1: Coefficient of Correlation: Entropy (Y5) vs. 18 Independent Variables

Sr. No.	Variables	Coefficient of Correlation
1	Age in years (x1)	-0.067
2	Education (x2)	0.033
3	Family Education status (x3)	0.115
4	Family Size (No. Of members) (x4)	-0.027
5	Cropping Intensity (x5)	0.184
6	Farm size in bigha (x6)	0.074
7	Annual Income (x7)	0.025
8	Scientific orientation (x8)	-0.121
9	Independency (x9)	-0.129
10	Innovation Proneness (x10)	-0.124
11	Risk orientation (x11)	-0.239*
12	Economic motivation (x12)	0.007
13	Orientation towards Competition (x13)	0.085
14	Attitude towards discontinuance(x14)	0.146
14	Attitude towards Rejection (x15)	0.152
15	Social participation (x16)	-0.114
16	Utilization of Cosmopolite Sources of information (x17)	0.041
17	Training received in days in last 3 years (x18)	0.029
18	*significance of r at 5%=	0.230
19	**significance of r at 1%=	0.300

Economic gain has both consolation and contradiction. Consolation generates because present problem has been resolved and contradiction simmers because whether to justify the glory over the inglorious one. The competition in agrarian society is increasing while hegemony starts ignoring the access to income by others. The sudden surplus income creates a stress in the serene and soft relationship, the binding force is family.

$$[Y5 = 22.17 - 2.21 X11^{**}]$$

$$R2 = 0.06, R2 (adj) = 0.04, Se (estd.) = 4.77$$

Where, Y5 is social entropy

X11 = Annual Income (Rs/year/Capita)

R= Régression Coefficient SE = Standard Error

$$\text{Residual effect} = 0.6902095]$$

C. Motivation and Social Entropy : Technical discourses vs. Farmers' voice

Economic motivation is skewed version of emotion pinpointed for economic gain, may

be through competition, denial to others rights, or through a clandestine performance which again can be clever or a deceiver one. The elements of consumerism, an unhealthy competition, the other side of monolithic development has done more harms than the goods delivered by it. Innovation proneness has got profuse impact on generating competition to supersede the laggards and ultimately make them subjugated in a system hierarchy. If not properly refined every ego has got deleterious impact over the peers or the defeated ones amongst the peers. Farm size with high economic motivation has made one victorious and the others deleted ones. This has got, certainly, a catalyzing role in making social entropy a more complex hecatomb to make life confined and claustrophobic: this is what we call Social Entropy.

D. Knowledge, Motivation, Sources of Information, Family Education..... are adding entropy and chaos, gone inevitable and intrigue as a system function

Table 2: Path analysis for estimating direct, indirect and spurious effect

Entropy (Y5) vs. 18 exogenous Variables

Sl. No.	Variables	Direct effect	Indirect effect	Total effect (r)	Substantial Indirect effect		
					I	II	III
1	Age in years (x1)	-0.02799	-0.03901	-0.067	0.02751 (x2)	-0.02179 (x6)	0.01990 (x10)
2	Education (x2)	-0.07394	0.10694	0.033	0.09631 (x3)	-0.03617(x10)	0.02750 (x6)
3	Family Education status (x3)	0.11994	-0.00494.	0.115	-0.05937 (x2)	0.03206 (x7)	-0.02759 (x9)
4	Family Size (No. of members) (x4)	-0.13765	0.11065	-0.027	0.06436 (x6)	-0.02452 (x8)	-0.1624 (x9)
5	Cropping Intensity (x5)	0.08339	0.10061	0.184	-.04264(x10)	0.02735(x3)	0.02603(x9)
6	Farm size in bigha (x6)	0.14627	-0.07227	0.074	-0.06057 (x4)	-0.04341 (x8)	0.02959 (x12)
7	Annual Income (x7)	0.11055	-0.08555	0.025	-0.05007 (x10)	0.04502(x12)	0.03478 9x3)
8	Scientific orientation (x8)	-0.10436	-0.01664	-0.121	0.06085 (x6)	0.05043 (x12)	-0.03761 (x11)
9	Independency (x9)	-0.19570	0.0667	-0.129	0.03583 (x17)	0.01931 (x6)	0.01691 (x3)
10	Innovation Proneness (x10)	-0.18714	0.03394	-0.124	0.03505 (x7)	0.02804 (x12)	0.02435 (x3)
11	Risk orientation (x11)	0.12864	-0.05186	-0.239*	0.03062 (x12)	-0.02356 (x15)	0.02311(x6)
12	Economic motivation (x12)	0.13456	-0.12164	0.007	-0.04454 (x11)	-0.04091 (x8)	-0.03869(x7)
13	Orientation towards Competition (x13)	0.11082	-0.04956	0.085	-0.01445(x4)	0.01404(x11)	-0.01295(x10)
14	Attitude towards discontinuance (x14)	0.10025	0.03518	0.146	0.02776(x8)	0.02200(x16)	-0.01957 (x9)
15	Attitude towards Rejection (x15)	-0.10000	0.05175	0.152	0.04398(x11)	-0.03975(x12)	-0.02565 (x7)
16	Social participation (x16)	0.10356	-0.014	-0.114	-0.02717(x10)	-0.02438(x14)	0.02300(x7)
17	Utilization of Cosmopolite Sources of information (x17)	0.00234	-0.06256	0.041	-0.06771(x9)	0.02384(x6)	0.02100(x16)
18	Training received in days in last 3 years (x18)	0.00234	0.02666	0.029	0.02807(x3)	0.02326(x4)	-0.02056(x2)

It is clear from the table that family education, Economic motivation, Orientation towards competition and Attitude towards rejection has been precisely chosen for conceptualising Social Entropy. Farmers in different parts of India and here in west Bengal, are engaged in or confronted with each other to show the power or defined their rights. The ambition for earning more may deny the rights of others or a sense of flamboyant intrusion may make others feel suppressed or denied. The attitude towards rejection may not go as a placid social action, but may generate harsh social reaction, too. These all are becoming more complex by the oriented towards competition.

Competition never goes linear or insulated, rather it begets splash of micro-confrontations of aims and interests, a vision and vistas of goes and gateways. That's why it is really scintillating to see that the interaction between right side and left side variables have assumed the character of a 'chi late' function wherein, the predicted character 'social conflict has directed and precisely selected some of the right side factors or ultimately being defined as congenital and interactive disposition of social conflict.

Table 3: Canonical Variate of Root 4 {Social Entropy (Y5) vs. 10 Independent Variables}

Left Side	Right Side Variables	
Social Entropy	Age (X1)	-0.169
	Family Education Status (X3)	-0.205
	Cropping Intensity (X5)	-0.214
	Farm Size (X6)	-0.249
	Annual Income (X7)	-0.336
	Economic Motivation (X12)	-0.205
	Orientation Towards Competition (X13)	-0.304
	Attitude Towards Rejection (X15)	-0.102
	Utilization of Cosmopolite Sources of Information (X17)	-0.168



G. Entropy Pyramid- Disagreement to Alienation resulting Social Entropy of system

Continuous dissonance between *in situ* and *ex situ* knowledge would lead, as the empirical study evidences, to the inevitable consequence of social entropy. If the entropy sustains to remain for a protractile period, it would generate a deleterious impact on food as well as social security. The sub orbital configuration follows the value of beta-coefficient in an increasing order.

CONCLUSION :

The entire paper has examined the huge aspects of dissonance and entropy in the flow of knowledge and technology socialization process having impact on social metabolism as well as food security. Agricultural production system is basically a flow and exposition of knowledge, flow-in and flow-out, that can be expressed in different forms of compliances or conflicts. While farming system as a whole is passing through unrest and chaos of knowledge non-compliance, entropy is a must to generate and of course would lead to a neo equilibrium state.

The present study was a concept paper on social entropy, an analogy of principle of Second law of thermodynamics. According to second law of thermodynamics transformation from matter to energy is an irreversible phenomenon therefore it needs to be kept at a manageable level. The gradual modernization in agriculture has produced the jerk, chaos or disorder following the attitudes of the farmers towards discontinuance of the stale technologies and their increasing attitude towards rejection. This has an explicit exhibition of non-compliant behaviour, attitude towards disagreement, conflict and ultimately gets alienated. This has gradually added to, that can be refer to, social entropy.

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