The emergence of a hybrid mode of knowledge production in the Generation Challenge Programme Rice Research Network (GCP-RRN) in India: Exploring the concept of Commons-Based Peer Production (CBPP)☆

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A B S T R A C T

The Generation Challenge Programme (GCP) was an international agrarian knowledge-production programme created in 2003 by the CGIAR. GCP aims at developing drought tolerant varieties by reconciling upstream biotechnology based advanced research with the downstream development at the farmer’s field. The objective of this paper is to apply the theory of Commons Based Peer Production (CBPP) to analyse the knowledge production process of GCP, especially the case of drought tolerant rice research network in Indian context (GCP-RRN). CBPP represents the theorisation of a mode of production that can be distinguished from market (private) and state (public) knowledge-production systems that was developed by observing the phenomena of Free and Open Source Software (FOSS). The organisational attributes of the CBPP mode applied in computer software production include the modulation of work, small-size granularity of components, and mechanisms that integrate these modules into an end product. Socio-economically, this form of production is based on cooperation, collaboration and collective action rather than property, contract and managerial hierarchies. This paper argues that GCP-RRN knowledge production is basically a hybridised one in which there are certain inclinations towards CBPP within certain larger context, and there are other attributes too that do not fall within CBPP theorisation. Further, this paper elaborates on the implications of this hybridised model for agrarian knowledge production discourse and institutions.

1. Introduction

The Generation Challenge Programme (GCP) was an international agrarian knowledge-production programme created in 2003 by the CGIAR. Running for ten years until being wound up in 2014, the GCP had as its general strategic aim the improvement of crops for drought-prone and harsh environments through advanced upstream research and development at the farmer’s field through the facilitation of downstream delivery, mostly through other partners (CIMMYT et al., 2003; Vroom, 2010). The GCP was organised within a huge, partner-based network for agricultural research and development among CGIAR institutes, National Agricultural Research Systems (NARS) institutes and other private institutes (Basu et al., 2011, 2017b; Basu, 2016).

The objective of this paper is to analyse the knowledge production of the GCP through the lens of Commons Based Peer Production (CBPP), a mode of production distinct from both market (private) and state (public) systems, developed by Benkler (2002) in the sphere of information and communications technology (ICT). (Benkler, 2006). Within the work of the GCP – a colossal programme (see Basu, 2016, p. 18) – we focus on the case of the drought-tolerant rice research network located mainly in India (henceforth, the GCP-RRN). The main aim is

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first, to investigate the type of knowledge production that is emerging within the GCP-RRN, for which we employ a comparative analysis using the software-based CBPP model; and second, to consider the implications of this for agrarian knowledge production and knowledge-producing institutions.

We employ the theoretical insights from CBPP to analyse the knowledge-production process of the GCP-RRN for three reasons. First, knowledge production in the GCP was organised in networks (analytically aggregated by us as the RRN) through which breeding material was accessed and shared. Thus, in respect of the co-development and sharing of information, the work of the GCP in agrarian (rice) development appears to share similarities with the CBPP model in the software arena (Basu, 2016). Second, our previous analyses of the GCP-RRN from the perspectives of knowledge-production theories (Basu, 2016; Basu et al., 2017b) revealed tendencies that are closely aligned with the CBPP framework. Specifically, the decentralised organisation, intrinsic, non-monetary motivation of the scientists and the volunteerism involved made an analysis of the GCP-RRN from the CBPP perspective a logical follow-up. Third, Benkler himself (2006, p. 341) indicated the GCP as a useful example of CBPP. Thus, GCP has an already established connection with the CBPP literature, therefore, which we aim here to explore. Indeed, as Troxler (2011) has argued, different models of CBPP emerge in different realms and in different systems; thus, this study comprises a case-study of CBPP in the context of agrarian knowledge production.

This research may also claim to be significant for the following reasons. First, most CBPP studies until now have been limited in scope, confined, that is, to peer-production phenomena in the software arena and/or taking a single perspective on the economic aspects of CBPP (in terms of efficiency, productivity and its potential superiority over market-based production systems) (Gillespie, 2013; Landini, 2013; Mansell, 2013; Meng and Wu, 2013; Schmidt, 2012). In this paper, we give special attention to non-economic aspects of the CBPP model, particularly in the ways it is socially organised in the context of the production of agrarian knowledge in an overarching institutional sphere (Basu et al., 2017b). Thus, this investigation adds a further dimension to the theoretical discussion of CBPP.

Second, by reflecting on the concrete practices of agrarian knowledge development of GCP-RRN, it becomes possible to indicate some possibilities of non-proprietary knowledge development and the connection of breeding practices to local context. This is pertinent in the context of criticism of the operation of intellectual property rights (IPRs) in agricultural research over recent decades, as restricting the sharing of knowledge, separating (institutional) knowledge development from the local context and ultimately deterring innovation (Atkinson et al., 2003; Heller and Eisenberg, 1998; Kloppenburg, 2010a; Ruivenkamp, 2005; Graff and Zilberman, 2001; Basu et al., 2011). Third, the research organisation of the Indian NARS – the Indian Council of Agricultural Research (ICAR) – has been heavily criticised for its centralised science model and institutional hierarchy (Raina, 2003; Raina et al., 2006; Sulaiman and Hall, 2002). A major reform of ICAR, towards more decentralised, bottom-up and flexible institutional structures is long overdue (Mruthyunjaya and Ranjitha, 1998). Clearly, the emergence of CBPP here has implications for policy.

This article is divided into six sections. Following this introduction, we elaborate on the theoretical framework, we outline the research methodology employed and then we present the empirical findings of the study. Next, in Section 4, the empirical findings of the GCP-RRN study are presented. This is done in five sub-sections based on major features of CBPP, with a reflective sub-section appended to each. After that, in Section 5, we provide an analysis of the GCP-RRN, in four sub-sections according to organising elements of CBPP. This is followed by a conclusion focusing on the practical implications of the study.

2. Theoretical framework

Benkler (2002) developed the theory of CBPP by observing the trends of free and open-source software (FOSS) production through the Internet. This, he found, occurs in a decentralised manner, generally constructed in a more-or-less informal and loosely structured way. There is no compulsion to participate in software-production projects, with people becoming engaged for a variety of reasons, such as for the pure pleasure of creation, out of a particular sense of purpose, to contribute to a social cause, satisfy psychological needs, build social relations for a common purpose and/or create a certain sense of belonging (Hertel et al., 2003). Referring to processes such as the development of Linux kernel, Benkler thus perceived the emergence of a new mode of production, which he showed to be based on an organisational innovation. Developing the theory, Benkler (2006) identified the new mode in terms that can be analysed as comprising three main structural attributes.

First, the software was produced through a system of independent components or modules. The new mode of production, therefore, involves a modularisation of work, enabling production to be incremental and asynchronous, pooling the discrete efforts of different, importantly unconnected (autonomous) individuals with different capabilities working at different times and places. Second, the modularised process enabled a relatively large pool of contributors that were predominantly small in size, or fine-grained, to be pooled; the (fine) granularity of the modules or components thus becomes a characteristic feature of and crucial to the new mode, enabling the incorporation of the efforts of those with relatively low levels of motivation and/or access to resources. Heterogeneous granularity in the software arena, therefore, refers to this accommodation of relatively large numbers of variously but especially small-grained contributions, allowing people to collaborate according to their commitment/resources. Third, Benkler and Nissenbaum (2006) observed that the various individual efforts were integrated at a rather low cost. Thus developed the new mode of peer production, with mechanisms by which the modules (components) are integrated into a whole end-product.1

Benkler (2006) further argued that the CBPP mode is more productive than the market- and/or state-based systems, because it relies on participants’ positive motivations, both extrinsic (enhancing reputation and developing human capital and social networks) and intrinsic (satisfying psychological needs and providing pleasure and a sense of social belonging). The CBPP mode does not aim at profit maximisation; instead, the aim is to gain knowledge, experience and reputation, creating value for the community and sharing resources for a particular social purpose (Benkler, 2004; Benkler and Nissenbaum, 2006). CBPP is also based on communal validation and negotiated coordination (Bauwens, 2005, 2009). Notably also, we might add, the community members also participate in the production as a community of users; that is, the end-users are intimately involved in the production of the knowledge as technology development. They own their own knowledge-making process, as it were.

Since profit maximisation or direct monetary compensation is unimportant in this mode, resources that are created through it are held in common, collectively by a community. Basically, there are no competing claims to property rights for personal or similar gain; it is the whole that benefits, not the parts, any one individual. Thus, the resources created through CBPP are shared among the members of the community and others (there may or may not be restrictions), enabled

1 The issue of low-cost integration is not investigated here as it has little relevance to the development of drought-tolerant plant varieties, since the production process located at different agro-ecological sites cannot be separated from the actual product itself; low-cost integration makes sense when discussing software development where different parts of the product are eventually integrated into a final whole, i.e. the software; here, however, the development of the product is holistic, so there is no need for end-stage integration.
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