



Figure 2. Time series of the second-order indicator, Papers \times Papers/GDP from 1995 to 2009 shows the very slow rise of India and the rapid decline of EU and US.

region. The number of papers follows as a simple product of $GDP \times (\text{papers}/GDP)$ and can be thought of as a first-order performance indicator. If this is continued to the second order through the operation, $GDP \times (\text{papers}/GDP)^2$, which can also be written as $(\text{papers} \times \text{papers}/GDP)$, we

have a proxy or measure for a second-order performance indicator. It can be interpreted to represent a scalar measure of the scientific activity of the country that takes into account both quality of performance and quantity of performance. In 2009, if we take China's second-order

indicator as the norm, India accounts for 0.28 of the Chinese effort, whereas EU and US are 3.63 and 2.93 times more active respectively, than China. Figure 2 displays the time series of the second-order indicator, papers \times papers/GDP, from 1995 to 2009. The relatively faster rise of China and the rest of the world, the very slow rise of India, and the rapid decline of EU and US are easily noticed.

1. Spengler, Oswald. *The Decline of the West* (eds Helps, A. et al.), Oxford University Press, New York, 1991; ISBN 0-19-506751-7
2. <http://www.nsf.gov/statistics/seind12/>
3. <http://www.nsf.gov/statistics/seind12/append/c5/at05-27.xls>
4. <http://www.nsf.gov/statistics/seind12/append/c6/at06-02.xls>
5. Prathap, G., *Curr. Sci.*, 2008, **94**, 1113.
6. Prathap, G., *Curr. Sci.*, 2010, **98**, 1160–1161.

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Indicators for occurrence of groundwater in the rocks of Eastern Ghats

Groundwater is struck at various depths in different places. For example, it may be available at a depth of 20–30 m at some places in MVP Colony, Visakhapatnam, Andhra Pradesh, and the rig may not strike water even after going beyond 60 m in Lawson's Bay Colony, which is not far away from MVP Colony. Similar conditions may be true in other places with rocks occurring in the Eastern Ghats.

The Eastern Ghats passes through the states of Odisha, Andhra Pradesh and Tamil Nadu. The important rocks are khondalites, leptynites and charnockites. The rocks of charnockites are predominant in Tamil Nadu; the khondalites and leptynites in Andhra Pradesh and the khondalites in Odisha. They have different characters of water-retaining capacities.

Thorough background information about the geological formations of any

area is an important prerequisite before conducting any survey for exploration of groundwater. The charnockites are massive, hard, compact, fine- to medium-grained and black-coloured (Figure 1 a), and do not have the capacity to transmit and store water, as they are not easily weathered and fractured due to their higher quartz content than that of feldspar and their fine- to medium-grained nature. They are generally used as road metals due to their hardness. Further, the khondalites are medium- to coarse-grained, light to dark brown in colour, with dark-pink dots, garnets (Figure 1 b), and are not as hard as charnockites. They are easily weathered and fractured due to their higher feldspar content than that of quartz and their medium- to coarse-grained nature. They have the capacity to transmit and store water. Sometimes,

clays are formed due to intensive fracturing of the khondalites, which do not support transmitting water. On the other hand, the leptynites, medium-grained and light cream to grey-coloured (Figure 1 c) are easily weathered and form light cream or white material. Generally, they support the occurrence of groundwater, but their areal extension is limited.

If black-coloured rock or powder is observed during digging or drilling, it indicates the occurrence of charnockites and the possibility of groundwater occurrence is rare unless the rocks have sufficient fractured network. If colour of the rock is brown, the occurrence of khondalites is expected, with a scope for groundwater. If the rock is cream in colour, the occurrence of leptynites is indicated and groundwater occurrence is less compared to that in the khondalites.



Figure 1. a, Charnockite; b, Khondalite and c, Leptynite.

Another possibility is that the geological formations occur either vertically or horizontally or both and are not uniform within a short distance of 100 m. Hence, a systematic hydrogeological survey for the search of groundwater is necessary. The survey includes collection of data on soils (to know the infiltration capacity of soils), drainage conditions (to know the surface-rock permeability conditions), slope factors (to know the surface and subsurface run-off conditions), depth to

water levels (to know the groundwater flow conditions as well as the water storage column conditions), lithological conditions (to know the aquifer characteristics of rocks) and orientation of the geological structures (to know the direction of weak zones, which act as avenues for movement of water), followed by hydrogeoelectrical survey (to know the depth-wise hydrogeological conditions). The hydrogeological survey must be conducted at the existing wells in the

vicinity before starting it in the proposed study area.

Data of both the surveys must be correlated before recommending for exploration of groundwater.

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NAAS ratings

The method for evaluating the scientific journals for awarding 'NAAS ratings' is being improved from time to time by the National Academy of Agricultural Sciences (NAAS), based on the feedback received. Therefore, it has been a futile exercise by Bishwapati *et al.*¹ in doing a comparative analysis of NAAS ratings of 2007 and 2010 for Indian journals. It would have been better if the authors clarified some of the points raised by them before publishing their analysis in *Current Science*. However, replies to some specific points raised by them are as follows:

(i) NAAS ratings of some journals having impact factor (IF) have come down.

As in the case of 2010, in 2007 also all the journals having Thompson-Reuters IF were assigned NAAS ratings from 6.1 to 10.0. However, at that time the scale was narrow as all the journals having IF 4.0 and above were assigned maximum rating of 10.0. In 2010, the scale has been expanded and all the journals with IF 18.0 and above have a maximum rating of 10.0. This is the reason why NAAS ratings of some journals like *Current Science* have come down marginally.

(ii) NAAS ratings of non-IF category journals have changed.

The NAAS ratings have changed because from 2010 onwards, the non-IF category journals are being evaluated on the basis of their scientific contents as well as the information provided on

some specific points like timeliness, periodicity, citations, membership, etc. by the publishers/editors in a prescribed proforma. The proforma for the assessment of research journals and guidelines for its filling are available on the NAAS website, www.naasindia.org.

1. Bishwapati, M., Lyngdoh, N. and Challam, T., *Curr. Sci.*, 2012, **102**, 10–12.

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Are field studies in botany really essential?

The 'living blue planet', the earth is an embodiment of various forms of life ranging from plants to animals, including man and microorganisms which inhabit

water, air and soil. There is a concern that 20–25% of the tropical rain forests may be lost by the end of this century and many existing life forms could

become extinct. Our former late Prime Minister, Smt Indira Gandhi believed that the survival of man is dependent on the survival of animal and plant life,