

	<ul style="list-style-type: none"> • Peace, justice and strong institutions
Opportunities for participatory data collection	The questionnaires can be both self-reported and administrable in an interview method.
Additional information	
References	Mayer, F. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. <i>Journal of environmental psychology</i> , 24, 503-515

22.16 Prevalence of attention deficit/ hyperactivity disorder (ADHD)

Project Name: CONNECTING Nature (Grant Agreement no. 730222)

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Behavioural development and symptoms of attention deficit/ hyperactivity disorder (ADHD)	Health and Wellbeing
Description and justification	<p>Attention Deficit/Hyperactivity Disorder (ADHD) is the most commonly diagnosed behavioural disorder in children (Taylor and Kuo, 2011). A series of studies have documented reductions of symptoms of ADHD in children when they perform activities in green outdoor environments, independent of age, gender, income groups, community types or geographic regions (Kuo & Taylor, 2004). A walk of barely 20 minutes in a park holds more significant effects than a downtown or neighbourhood walk (Taylor & Kuo, 2011). Furthermore, children with ADHD who play regularly in green play settings were found to have milder symptoms than children who play in built outdoor and indoor settings (Taylor & Kuo, 2011). Authors report that only relatively open green spaces have this effect (Taylor & Kuo, 2011).</p> <p>A large study of children between the ages of 7 and 10 in Barcelona found empirical support for the beneficial impact of contact with green spaces and blue spaces (beaches) on indicators of behavioural development and symptoms of attention deficit/hyperactivity disorder (ADHD) in schoolchildren. More playtime spent in green spaces and higher frequency of beach visits/attendance was found to be associated to better behavioural development, emotional adjustment, and better peer relationships,</p>

	<p>whereas less surrounding greenness was associated to higher ADHD scores (Amoly, Dadvand, Forns, López-Vicente, Basagaña, Julvez, Alvarez-Pedrerol, Nieuwenhuijsen, & Sunyer, 2014).</p> <p>Finally, a longitudinal study conducted in New Zealand, using data from a sample of almost 50.000 children born in 1998 assessed associations between ADHD prevalence and proximity to green spaces across the lifespan, as well as rural living, while controlling for other variables relevant in the onset of ADHD (Donovan, Michael, Gatziolis, Mannetje, & Douwes, 2019). The study found that children who had always lived in a rural area and those that were exposed to greenness after 2 years of age were less likely to develop ADHD. Also, prenatal and proximity to greenness in the first two years of life had no association to prevalence of ADHD (Donovan et al., 2019).</p>
<p>Definition</p>	<p><i>ADHD</i> is a disorder that makes it difficult for a person to pay attention and control impulsive behaviors. He or she may also be restless and almost constantly active. ADHD is not just a childhood disorder. Although the symptoms of ADHD begin in childhood, ADHD can continue through adolescence and adulthood. Even though hyperactivity tends to improve as a child becomes a teen, problems with inattention, disorganization, and poor impulse control often continue through the teen years and into adulthood (Attention-Deficit/Hyperactivity Disorder (ADHD): The Basics, n.d.).</p> <p><i>Diagnostic tools:</i> Diagnostic and Statistical Manual of Mental Disorders (DMS-V), International Classification of Diseases (ICD, 10th revision)</p>
<p>Strengths and weaknesses</p>	<p>+ previous empirical evidence as to relationship between improved symptomatology of ADHD and exposure to nature and urban green space</p> <p>- research focused only on hyperactive/ADHD children; no data on hyperactive adults and exposure to greenness</p>
<p>Measurement procedure and tool</p>	<p><input checked="" type="checkbox"/> <i>Quantitative P:</i> Scale/Scale inventory/Questionnaire (survey procedure, paper-and-pencil administration, computer-based administration)</p> <ul style="list-style-type: none"> o T: <i>Strengths and Difficulties Questionnaires</i> (SDQ, Goodman, 1997) is a behavioral screening questionnaire used to generate separate scores for conduct problems, emotional symptoms, and hyperactivity (Goodman, 1997). The SDQ asks about 25 attributes, 10 of which would generally be thought of as strengths, 14 of which would generally be thought of as difficulties, and one of which—" gets on better with adults than with

	<p>other children"—is neutral. The 25 SDQ items are divided between 5 scales of 5 items each, namely Hyperactivity Scale, Emotional Symptoms Scale, Conduct Problems Scale, Peer Problems Scale, Prosocial Scale (See Goodman, 1997, p. 582 – items scoring).</p>
Scale of measurement	<ul style="list-style-type: none"> ▪ Strengths and Difficulties Questionnaires (SDQ, Goodman, 1997) <p><i>For each item (/.../), please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of the child's behaviour over the last six months or this school year.</i></p> <p>Considerate of other people's feelings / Restless, overactive. cannot stay still for long / Often complains of headaches, stomach-aches or sickness / Shares readily with other children (treats, toys, pencils, etc.) / Often has temper tantrums or hot tempers / Rather solitary, tends to play alone / Generally obedient, usually does what adults request / Many worries, often seems worried / Helpful if someone is hurt, upset or feeling ill / Constantly fidgeting or squirming / Has at least one good friend / Often fights with other children or bullies them / Often unhappy, down-hearted or tearful / Generally liked by other children / Easily distracted, concentration wanders / Nervous or clingy in new situations, easily loses confidence / Kind to younger children / Often lies or cheats / Picked on or bullied by other children / Often volunteers to help others (parents, teachers, other children) / Thinks things out before acting / Steals from home, school or elsewhere / Gets on better with adults than with other children / Many fears, easily scared / Sees tasks through to the end. good attention span</p>
Data source	
Required data	<ul style="list-style-type: none"> ✓ Essential: NBS characteristics for each city/site, more specifically nature of activities one can get involved into while engaging with nature, opportunities for play and physical exercise, etc.
Data input type	Quantitative
Data collection frequency	After NBS implementation and aligned with timing of HW14 study (i.e., relevant to study design, observation of children's play, etc.)
Level of expertise required	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Methodology and data analysis requires high expertise in psycho-social research <input checked="" type="checkbox"/> Quantitative data collection requires no expertise

Synergies with other indicators	HW1 Sustainable nutrition/adoption HW3 General Wellbeing and Happiness HW12 Restoration-Recreation: Enhanced physical activity and meaningful leisure HW13 Levels of aggressiveness and violence HW15 Exploratory behaviour in children
Connection with SDGs	Goal 3. Ensure healthy lives and promote well-being for all at all ages Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
Opportunities for participatory data collection	-
Additional information	
References	<p>Amoly, E., Dadvand, P., Forns, J., López-Vicente, M., Basagaña, X., Julvez, J., ... Sunyer, J. (2014). Green and blue spaces and behavioral development in Barcelona schoolchildren: the BREATHE project. <i>Environmental health perspectives</i>, 122(12), 1351–1358. doi:10.1289/ehp.1408215</p> <p>Attention-Deficit/Hyperactivity Disorder (ADHD): The Basics (n.d.). Retrieved from https://www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder-adhd-the-basics/index.shtml</p> <p>Donovan, G., Michael, Y., Gatzliolis, D., Mannetje, A., & Douwes, J. (2019). Association between exposure to the natural environment, rurality, and attention-deficit hyperactivity disorder in children in New Zealand: a linkage study. <i>Lancet Planet Health</i>, 3, e226–234.</p> <p>Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. <i>Journal of Child Psychology and Psychiatry</i>, 38, 58 1-586.</p> <p>Kuo, F. E., & Taylor, A. F. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: evidence from a national study. <i>American journal of public health</i>, 94(9), 1580–1586. doi:10.2105/ajph.94.9.1580</p> <p>Taylor, A., & Kuo, M. (2011). Could Exposure to Everyday Green Spaces Help Treat ADHD? Evidence from Children's Play Settings. <i>Applied Psychology: Health and Well-Being</i>, 3, 281 - 303. doi: 10.1111/j.1758-0854.2011.01052.x</p>